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REHABILITATION OF WAR PERSONNEL SUBJECTED TO AURAL TRAUMA

By Lieut.-Col. D. S. McEachern, R.C.A.M.C.

Consultant on Medical Research and Development, Directorate General of Medical Services, National Defence Headquarters, Ottawa

THE war has left us a legacy of auditory damage, the magnitude of which cannot yet be assessed. It has also provided an opportunity for the development of a broad and enlightened program for the rehabilitation of the deaf and hard-of-hearing.

CAUSES OF IMPAIRED HEARING

In the Army, cases with all degrees of impaired hearing are met with and they are due to a number of different causes.

First, hearing tests applied at induction centres have been rough and unquantitative. A considerable number of men with impaired hearing have doubtless gone unrecognized and have been inducted into the Army, only to be recognized later either as a result of closer observation or further progression of the deafness. No figures are available for the Canadian Army, but it has been estimated by the Office of the Surgeon General that about 50,000 men with impaired hearing have been inducted into the U.S Armed Forces. Approximately 50% o the patients admitted to Deshon General Hospital because of defective hearing gave definite histories of that deficiency before induction, yet more than ½ of these men were recorded as having had normal hearing at the induction examination. The same has been true in the U.S. Army's other two Deaf Centres, namely, Borden General Hospital, at Chickasha, Okla., and Hoff General Hospital, at Santa Barbara, California. It is probable that figures for the Canadian Army will be proportional.

Second, cases also occur in which previous impairment of hearing has become aggravated as a result of battle action.

Third, a considerable number of cases are the result of otitis media, otosclerosis and other conditions which probably would have developed had the individual been in civilian life.

Fourth, many cases are appearing now which can be directly attributed to battle. These can be classed as follows:

(*a*) *Exposure to blast.*—It is now quite clear that the sudden and enormous changes of air pressure associated with explosion may cause permanent impairment of hearing, either due to rupture of the ear drum or to irrecoverable changes in the inner ear, even though the ear drum may remain intact. Returning soldiers rate the German .88 mm. shell as the greatest offender, with the mortar shell a close second. Needless to say, the firing of our own large guns can bring about the same effect on those nearby, save that the men are usually prepared for the blast and have a chance to protect their ears.

Some of you will have read of the experiences of one of our R.C.N. Medical Officers in the May issue of the *Journal of the Canadian Medical Services*. During one action seven members of the crew of his small frigate sustained ruptured ear-drums from their own gun-fire.

There is no question that on some occasions deafness due to blast has been misinterpreted by the medical officer as due to hysteria. In commenting on missed diagnoses, one Canadian psychiatrist in charge of a Forward Exhaustion Centre, remarked upon the large number of cases of ruptured ear-drums. He referred these to a general hospital after carrying out local treatment.

(*b*) *Exposure to continued or repeated loud noise* and vibration is also capable of producing permanent hearing loss. Thus a study in the U.S. of a group of 23 rifle instructors with one or two years of experience showed very appreciable degrees of deafness. For similar reasons the R.C.N. has been concerned about the hearing of engine room personnel in some of their smaller ships where the noise level sometimes reaches 150 decibels. The R.C.A.F., too,

has long been studying this problem in relation to aircraft noise and intercom. sets. Little is known about what kind of army employment predisposes to deafness of this type, but tank crews and machine gunners seem to be likely candidates.

Magnitude of Problem

It is not possible as yet to get accurate figures on the incidence of service-connected-deafness. In the last war there were 23,772 cases of deafened servicemen in the British armed forces. In this war up to January 1, 1945, the figures for diseases of the ear are 5,321, of these 49% were awarded pensions. The Americans are prepared to admit between 10,000 and 14,000 cases to their Aural Rehabilitation Centres during 1945. These figures do not represent all men with defective hearing, but only those with sufficient loss to qualify for the rehabilitation program. During the first 8 months of operations of the U.S. program, about 50% of cases admitted were due to old unrecognized disease and not to battle action. In the past three months, however, about 72% of cases admitted to one Deaf Centre have been from overseas and a large number of these suffered acoustic trauma due to combat.

Figures for the Canadian Army are not available since discharges for ear conditions cannot be broken down to show battle injuries. It is ominous to note, however, that the overseas discharges for ear conditions, which had been running along fairly steadily at about 0.36 per thousand strength per annum, rose to 1.30 per thousand strength a few months after our troops went into action in Sicily. We presume that this fourfold increase is the result of battle action.

The above figures show that the problem is a large one. Think, however, of the number of men who have sustained moderate degrees of auditory damage which will only come to light in later years. They will certainly, and in many cases justifiably, make claims for pension and rehabilitation.

Deafness as a Handicap

Deafness carries with it a large number of psychological, social and employment factors which remove it from the simple orbit of assessing hearing loss; in fact the correction of these factors is often just as important as the improvement of hearing by the fitting of a hearing aid. These must be considered in any rehabilitation program. Let us discuss them for a moment.

(*a*) *Psychological factors.*—It is a curious thing that the deaf person may develop attitudes of mind which are never noted in the person who is going blind. He may become aloof, depressed or develop unwarranted suspicions. He may be looked upon as eccentric or boring, sometimes mentally deficient, and often psychologically maladjusted.

The ears seem to keep us in contact with the outer world in a different and a more profound way than do the other senses. In attempting to explain the difference between social use of hearing and of vision, one doctor put it to me this way—"A normal soldier has just returned from overseas. You say to him 'here is a small motion picture screen. If you like I will throw on a picture of your wife and children coming to greet you. On the other hand, over there is a telephone and you can call them up and talk to them if you like. Which do you think the man would choose?' The telephone, of course!"

Deaf people speak of the way they feel "out of the world", and when speaking of a hearing aid often say that they seem to "step into a new world" when they turn it on. This feeling of "deadness" is probably more fundamental than mere denial of conversation with others. Ramsdell, the psychologist, thinks that it is due to the cutting off of the myriad background noises, which normally keep us aware, subconsciously, of the passage of time and of our place in the temporal flow of life. The hard-of-hearing are apt to be peculiarly tense and restless and this often disappears at once when the hearing aid is turned on.

Deaf people are apt to "kid" themselves and to minimize their handicap. They are also apt to attempt concealment when the handicap is quite apparent to others. There is, too, a curious reluctance to employ a hearing aid, but this will probably be broken down as was the resistance to wearing spectacles not so many years ago.

In those whose deafness dates from childhood, there is often a tragic ignorance of ordinary social small talk which makes up so much of daily conversation and which can add spice and colour to drab pursuits. A person who has not learned this so-called "cocktail conversation" may live for years wondering what other people

say when they meet each other. Added to all the above there is sometimes a hissing bedlam of tinnitus and head noises with which the patient must live day after day and which may drive him to depression or suicide.

(*b*) *Deterioration of speech.*—Deafness, too, may result in faulty speech habits which create a further handicap in social life and employment, and which may even lead to ridicule It is an odd thing that many jokes have been built up about the deaf man and his ear trumpet, and about his misinterpretations. There is the friend who says "This is Thursday", to which the deaf man replies "So am I, let's go out and have one together." There are numberless stories of this type.

The deaf man may speak too loudly, or conversely, if he has good bone conduction and can hear his own voice well, he may speak too softly. He may develop a nasal intonation or fail to place his voice properly. He may stutter and mispronounce syllables. All of these work against him is social and business life.

(*c*) *Misinterpretation of sounds.*—Many sounds have lost their meaning for the deaf; others have become perverted. Localization may be poor. These faults may be intensified by a hearing aid, but they are susceptible to retraining procedures.

(*d*) *Suitability of employment.*—Finally, there are undoubtedly certain jobs in which the handicap of deafness will go relatively unnoticed as compared to others which will reveal it and strain it unnecessarily. Good vocational guidance is therefore an urgent need.

It is apparent from the above that any program designed to rehabilitate the hard-of-hearing must be a complex and well organized machine capable of assessing and correcting all the factors involved. It is completely worthless to do an audiometric test and then throw a hearing aid at the man. There must be a complete program which takes into account psychological re-adjustment, teaching of lip-reading, correction of speech defects, auricular training, selection of the most suitable hearing aid and training of the man in its use, and finally, guidance by an employment counsellor to a suitable job. No program less than this will give the soldier what he deserves and what the Director General of Medical Services has promised, *viz.*, the maximum benefit of treatment to every man.

An Integrated Aural Rehabilitation Program

The yardstick for this type of program has been set by the Surgeon General's Office of the U.S. Army which has three large aural rehabilitation centres in the United States. Each centre provides an integrated program of rehabilitation with the "over-all" direction of a skilled otologist. This enlightened and far-sighted scheme is the basis for plans being considered in Canada. It is hoped that these will be carried to a successful conclusion.

Choice of patients.—In the U.S. program, men selected for aural rehabilitation are those with hearing-loss which prohibits useful military duty, namely, 30 decibels or more in the better ear. In the beginning, it was planned to accept only those cases due to battle action. It now has become policy to accept all cases, including those in which deafness was present prior to induction. The reasons for this decision were as follows: (1) About 40% of these patients were saved for further army duty. (2) It held to the Surgeon General's decree that no patient must be discharged from an army hospital until maximum benefit of treatment had been obtained. (3) It was felt that the army had a responsibility towards those who were deaf at the time of induction or whose deafness had progressed in the service. (4) It was felt that in this way the problem could be best handled, and that if the army did not do it somebody else would have to. It seems likely that after the war the program may be taken over by the Veterans' Administration in order to handle the service-connected cases which will be appearing for many years to come.

Let us briefly describe the steps necessary in a complete rehabilitation program:

Assessment of cause and degree of hearing loss.—This of course demands a complete history and general medical examination in search of constitutional causes of deafness as well as careful clinical study of the ears. It also demands accurate and repeated audiometric curves to give a base-line for future comparison. As will be pointed out by other speakers, reliance must not be placed on pure tone audiometry but quantitative spoken voice tests must also be done. These do not always agree with the pure tone curves, but they are obviously much more like the day-to-day hearing tasks which the patient has to meet.

Canada is well advanced as regards audiometric and other apparatus. This has been developed at the Montreal General Hospital, by Dr. Hector Mortimer, in collaboration with the Northern Electric Company. The work has been done under the auspices of the Associate Committee on Army Medical Research of the National Research Council. Furthermore, a thoroughly sound-proof testing installation is at present under consideration at Montreal Military Hospital. It is on the basis of quantitative tests, performed at this centre that the most suitable type of hearing aid must be selected and the benefits of treatment gauged.

Lip-reading.—Every patient should undergo a concentrated course of lip-reading by expert teachers. This course as carried out at the three U.S. Army Aural Rehabilitation Centres for the deafened is completed in 8 to 10 weeks. Individual lessons are given to each man daily, and in addition he must attend a total of 35 practice classes. The mastery of lip-reading gives the patient an extra reserve of confidence over and above what he gets from his hearing aid.

Speech-correction.—About 25% of the hard-of-hearing need speech correction. The percentage is of course very much higher if deafness dates from childhood. A speech test is first run and after the type of defect has been diagnosed, the patient receives a number of individual lessons from experts who have been chosen from civil life. Special apparatus has been introduced to aid in this work. An example is the "Mirrophone", an adaptation of the new magnetized wire method of recording and reproducing the voice. The machine records the patient's voice for a minute and then plays it back to him as loudly or softly as desired. The recording will keep indefinitely and can be made before and after the speech correction course for comparison. On the other hand a recording can be wiped out immediately by demagnetizing the wire and used again and again for practice purposes.

Auricular training.—Special personnel also drawn from civilian life teach the deaf man to weed out and discriminate in what he hears. Thus the very best use is made of the hearing that the man has. This is carried out both in individual lessons and for all patients in a daily "listening hour", during which various kinds of voices, types of music, household sounds, etc., are broadcast. The patients try to identify and localize these. The "listening hour" also provides a definite time and program every day, whereby the patient tests his hearing aid and compares it to other types he has worn on previous days.

Psychological department.—This is an important part of any all-out program. Patients are not sent to this department routinely, but are advised that they can discuss problems with the psychologist whenever they desire. Most patients who require psychological treatment come of their own accord after a week or ten days. This phase of the program should pay large dividends as regards the patient's social adjustment and happiness. There is nothing haywire or esoteric in the type of psychology practised by the psychologists at Deshon. It is right down to earth, full of commonsense—a genuine help.

Selection of hearing aids.—A number of problems have been well met by the U.S. program. To begin with, the policy has been laid down that no one commercial type of hearing aid will be provided. All hearing aids approved by the council on Physical Medicine of the A.M.A. are included in the library of instruments for fitting purposes. Exhaustive tests have shown that although about one-half dozen different makes of instruments are used in fitting the majority of men, sometimes a less popular instrument will excel all others for a particular case. The U.S. Army at present has five different makes of hearing aids, supplied on contract. These are bought at a price far lower than that charged to the general public, but it covers only the cost of the instrument and no later servicing. A program for the servicing of hearing aids has been recommended, however, by the Surgeon General's Office.

The selection of the most suitable hearing aid is based upon repeated audiometric and spoken voice tests, and also by repeated trials and gradings on the part of the patient. The department responsible for this is called "The Acoustic Clinic" and is under the direction of a skilled acoustic physicist. Each patient is looked upon as an individual problem. The steps in selecting a suitable hearing aid are as follows. They require two to three weeks of daily trials.

Step No. 1.—On the basis of audiometric tests, speech reception and discriminate tests,

and the medical diagnosis, a theoretical prescription is written for the type of hearing aid which should prove most useful. This narrows the field to 10 instruments.

Step No. 2.—A rough screening test is carried out with a number of different instruments. A technician gives gross tests and makes appropriate adjustments for each instrument.

Step No. 3.—The instruments are now transferred to the Hearing Aid library, from which the patient may draw any instrument for a period of up to 48 hours. He attends "Listening Hour" every day and grades the performance of each instrument on a permanent record card. The number of instruments are thus reduced to three or four of his own choice.

Step No. 4.—The three or four instruments chosen are now subjected to final hearing-aid evaluation tests. The apparatus used is the same as for speech reception testing, and compares the capacity of each instrument to transmit the spoken voice to the ear. Tolerance limit for background noise is also established.

The instrument performing best is the one selected, and if two instruments perform equally well the patient may choose the one he prefers. As a result of the above steps, each patient gets the best aid that is available for him. He learns to have confidence in it, and to care for it. About 75% of all men going through the rehabilitation program get hearing aids, the remainder either don't need them or don't benefit by them.

Employment counsellor.—A final step in the line would be a skilled "Employment Counsellor". Although there is no place for such a person in the American set-up, at present, it would seem reasonable to round out the program in this way. A thorough study should be made, in co-operation with civilian bodies, to find the right job for the deafened man.

CONCLUSION

It can be seen from the above, that hit or miss methods of handling the problem of deafness will get us nowhere. Service men who have sustained damage to their hearing as a result of service, deserve the same consideration as those who have had their eyesight or any other function impaired. There should be no difficulty in getting skilled teachers and trained personnel in Canada if an appeal is made.

If we are going to do our best by the Canadian soldier, a fully rounded program must be developed, in which the social, psychiatric and the employment factors are taken into consideration, as well as the technical ones on which we have laid emphasis in the past.

RÉSUMÉ

En dehors des chocs directs sur l'appareil auditif, l'étiologie de la surdité reconnait souvent parmi ses facteurs la répétition de bruits plus ou moins intenses. La guerre a été l'occasion de bruits de toutes intensités et nos soldats ont souffert de troubles de l'ouie dans une proportion de 1.30 0/00, notamment depuis le campagne de Sicile. Le handicap qui résulte de la surdité implique des facteurs psychologiques, sociaux et professionnels qu'il s'agit d'apprécier justement afin de donner à ce sujets une indemnité équitable. Il faut traiter et rééduquer les blessés de l'audition. Divers plans inspirés de ceux actuellement en cours aux Etats-Unis sont à l'étude. Le Canada est bien préparé et outillé dans la voie des travaux audiométriques. Les sourds devraient apprendre la lecture labiale et corriger leurs troubles d'élocution; ils devront également être habilement encouragés et pourvus de l'instrumentation la mieux adaptée à leurs besoins. Enfin, on leur donnera un emploi approprié au degré de leur surdité.

JEAN SAUCIER

SUBACUTE BACTERIAL ENDOCARDITIS WITH CEREBRAL EMBOLISM SUCCESSFULLY TREATED WITH PENICILLIN AND HEPARIN

By E. T. Green, M.D., C.M.

Orillia, Ont.

SUBACUTE bacterial endocarditis has remained a challenge to the medical profession since its recognition as a clinical entity. Many and varied drugs and agents have been tried in an attempt to sterilize the blood stream but there has always remained the problem of killing the organisms in the depths of the vegetations on the valve cusps. Some of the more recent agents used alone or in various combinations are: sulfonamides with or without heparin; four sodium paranitrobenzoate; neoarsphenamine; intravenous typhoid vaccine, dicoumarin; hyperthermia by fever cabinet. Published reports indicate that while some of these may have resulted in cure in isolated cases, results have not been consistent and the recovery rate has not been raised much above the 3 to 5% spontaneous cures normally expected.

Interest in the problem of subacute bacterial endocarditis has been stimulated by the recent publication of Loewe[1] in which he claims 74% clinical and bacteriological cures in a series of

54 unselected patients treated with combined penicillin and heparin. Of these, 8 were complicated by cerebral embolism and 5 were successfully treated. The disastrous results sometimes attendant upon the administration of heparin intravenously have apparently been overcome by Loewe in the development of a menstruum from which the heparin is slowly absorbed following subcutaneous injection, for he reports no serious reactions following this method. Previously Loewe and co-workers[2] reported seven consecutive recoveries from the disease following penicillin-heparin therapy.

The results of early work on treating subacute bacterial endocarditis with penicillin alone were discouraging. Keefer *et al.*,[3] on the National Research Council summarized the treatment of 17 patients as disappointing. It now would appear that inadequate amounts of penicillin were used. Treatment was likewise unsuccessful in a case reported by Herrell.[4]

More recent reports would seem to indicate that penicillin alone may prove as effective as penicillin-heparin. Dawson and others[5] report 27 cases of subacute bacterial endocarditis of which 22 were apparently cured. Of the successful cases 7 had penicillin alone and the remainder penicillin-heparin. Collins[6] and Pizzi *et al.*,[7] both report a case of the disease cured by penicillin alone and Herrell and others[8] at the Mayo Clinic treated two children successfully, with penicillin, in which the endocarditis was super-imposed on congenital heart disease. White and co-publishers report 9 cases treated with penicillin. Of these 4 received penicillin alone, the rest being given sulfonamides in addition. They claim four cures. One of these had penicillin alone.

Heparin is expensive and, at least by venoclysis, dangerous, likely to result in cerebral accidents and to cause febrile reactions which complicate the clinical picture. Many more series of cases will have to be investigated using penicillin alone and in combination with heparin before the value of heparin as an adjuvant may be assessed.

CASE REPORT

On September 22, 1944, the patient, a woman of 25 years, was admitted to hospital by ambulance. Two days before she had taken to bed at home complaining of a painful red area, the size of half a dollar, on the inside of the left leg halfway between ankle and knee. The next day a similar spot appeared on the inside of the right ankle. (In view of subsequent developments these would now appear to have been due to emboli.) Suddenly at 4.15 p.m. September 22, she complained of a feeling of numbness in the right leg and had difficulty with her speech. In three or four minutes the right arm felt numb and the right side of the face and she had a feeling that she would die at any minute but did not lose consciousness.

When the writer arrived a few minutes later the woman could still move the right arm but the right leg was immobile. There was a peculiar, rapid alternation in colour from a cyanosis of the face and hands to a waxy paleness. It was apparent that a cerebral vascular accident was in progress. By the time hospital was reached the right arm was completely paralyzed and there was a well-marked motor and sensory aphasia.

Previous illnesses consisted of scarlet fever at 8 years of age. No history of rheumatic fever or "growing pains". The patient made the statement that she had never been to a physician except for a pregnancy some five years before. This was not strictly correct, for I had examined her in my office several months before her present illness, at which time a systolic murmur was noted at the apex and she was questioned about previous rheumatic fever. The patient admitted to a tired, sluggish feeling for the past year but had carried on as usual.

On examination the soft, systolic murmur at the apex was present as before but no discernible heart enlargement. Blood pressure was 130/80. Spleen not palpable. Red cells, 4,720,000; Hb. 72%; white cells 8,500; blood sugar 101 mgm. %; non-protein nitrogen 28 mgm. %. Cerebrospinal fluid showed nothing unusual. Blood Kahn negative. The temperature at no time in the course of the illness exceeded 100.4°, nor the pulse 114. The diagnosis was for a time in doubt. The possibility of a hæmorrhage into a cerebral tumour was entertained, but the correct diagnosis was decided by the presence of *Strep. viridans* in three blood cultures taken on successive days.

Treatment consisted of 120,000 units of penicillin and 20 c.c. heparin in normal saline daily by continuous intravenous drip for 10 days, making a total of 1,200,000 units penicillin and 200 c.c. heparin. This was given by tying a cannula into the great saphenous vein at the ankle. It was necessary to use the corresponding vein in the other ankle when the first venoclysis stopped running after three days. The second intravenous continued for four days when, despite the heparin, a thrombus, which could be plainly seen and felt formed in the vein midway between ankle and knee. For the last three days a vein at the elbow was used and this route was tolerated best of all.

The temperature fell gradually to normal during the first three days but rose again and remained elevated until the intravenous was discontinued on the 11th day when it promptly subsided and remained normal.

Three days after treatment was started a blood culture was taken and proved to be sterile and all subsequent blood cultures have been negative. Before starting treatment there had been a gradual, moderate return of motion in the right leg, and some improvement in articulation, but not the slightest motion in the right upper extremity. Twenty-four hours after treatment was begun the patient could move the little finger of the paralyzed hand. In another forty-eight hours she could move the medial three fingers, and when venoclysis was stopped after 10 days' treatment she could raise the arm above the head, touch each finger to the thumb and had a fair grip. One week after completion of the course of treatment the patient was sitting out of bed, and six days later was allowed to go home.

This case has now been followed for seven months. All blood cultures, taken at 6 week intervals, have been sterile; the temperature, checked twice daily, on two occasions has risen to 99 but at all other times has been normal. Her weight is 170 pounds and she is in excellent health, having resumed her ordinary life and again undertaken all former household duties. The heart murmur has entirely disappeared. It cannot be heard in the erect or supine position

or after exercise. She states that the right leg is as good as ever. With the right arm she is able to carry a pail of water and the grip is as good as in the left hand. Only in performing small motions of the fingers, such as picking up a pin, has she any difficulty. On the debit side, there are in addition, certain trophic changes in the right arm and hand, and an occasional stumbling in pronouncing a difficult word.

SUMMARY

A review of the literature is given on the use of penicillin and penicillin-heparin in subacute bacterial endocarditis.

A case of apparent cure by penicillin-heparin is described in which the patient first came under observation because of a cerebral embolism, and in which therapy seems to have had a favourable influence in recovery from the effects of the embolism.

I wish to thank Dr. K. McKenzie of Toronto, Ont., who saw this patient in consultation and who suggested the correct diagnosis which was later confirmed by blood culture.

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"One of the clear impressions left by my student days in hospital at the beginning of the present century, is that of surprise and disappointment at the lack of conviction, and even of interest, which our teachers showed in medicinal treatment, in contrast to the care and enthusiasm which they devoted to diagnosis. I suppose that before I entered the wards I had assumed, with the world at large, that a correct diagnosis would regularly enable an appropriate and effective remedy to be applied. It was disappointing to discover that this was so rarely the result, and that the treatment would so often be prescribed with no better hope than to make the patient easier by alleviation of his symptoms, leaving Nature to deal if possible, with the cause of the trouble."—Sir Henry Dale.

MUCOSAL RESPIRATORY SYNDROME

By Major J. H. Stanyon, R.C.A.M.C. and Brigadier W. P. Warner, R.C.A.M.C.

IN the military hospitals of Canada, 17 cases have recently been collected, which were characterized by skin and striking mucosal lesions, frequently associated with pneumonia. In the last fifty years, a number of similar cases have sporadically appeared in the literature, but there has been a failure to recognize and stress the pneumonia which is often an integral and outstanding feature of this syndrome. Because of the severe mucosal and variable skin lesions, dermatologists see these cases most frequently and class them as erythema multiforme. Some physicians can recall a case, but to most the syndrome is unfamiliar.

This condition which we call "mucosal respiratory syndrome" is a prostrating, febrile illness with mucous membrane involvement producing conjunctivitis, membranous stomatitis, often an irregular skin eruption, lesions of the penis and a pneumonia.

In this Army series, it is a disease of young adult males. All of the cases occurred during the spring or autumn. It occurred sporadically in widely separated areas.

Two case reports only of 17 are given.

CASE 1

A sub-lieutenant in the R.C.N.V.R., aged 29, was admitted to hospital on October 21, 1943 and died on November 4, 1943. This young man had lived all his life in Ottawa. He had been a clerk for the past six years. He joined the Navy two months previously and had just recently returned from one month's basic training. He was quite well until three weeks prior to admission, but at that time, October 1, contracted a head cold, characterized by dullness in the head, stuffiness of his nasal passages, some post-nasal discharge and cough. This had almost subsided when he returned home from the training camp and he felt generally quite well. On October 19 he awoke feeling rather miserable, with a sense of general malaise, weakness and full frontal headache. However, he got up and went to church but later returned and remained in bed the rest of the day. During the day he took only fluids, complained of chilliness and generalized vague aches and pains and his headache became worse. The following morning even though he felt no better, he got up and went down to his office, but about 10.30 a.m. reported sick and was sent home.

From October 19 until admission to hospital three days later, he remained in bed and was seen several times by a Naval medical officer. This medical officer stated that the patient did not appear acutely ill during his stay in bed. He ran a low grade fever of 99 to 100 degrees, and seemed to have a "flu-like" infection, characterized by general malaise, chills, headache and non-productive cough. Bed rest had been prescribed with fluids and aspirin compounds. During his afternoon visit on October 21, the medical officer noted that the patient complained of increased weakness, and for the

first time mentioned that his mouth was sore. Three or four small blebs were noted on the buccal mucosa. At this time he was given 2 gm. of sulfathiazole and shortly afterwards he vomited. A few hours later he was again seen and it was noted that there were several blebs present in his mouth and he was referred to hospital.

Examination.—On admission the patient appeared ill. He was complaining bitterly about his mouth being sore and during the examination he coughed frequently. He denied any chest pain. Temperature 102°, pulse 100, respirations 26. He had marked bilateral suppurative conjunctivitis and photophobia. The conjunctivæ were injected and slightly œdematous. There was a moderate amount of purulent exudate in the conjunctival sacs.

Over the whole buccal mucosa, soft palate, and pharyngeal walls were scattered many vesicles and bleb-like structures varying in size from 1 to 15 mm. Some contained clear serous fluid, others purulent material, and still others were hæmorrhagic. In some areas the blebs had ruptured leaving shallow ulcers covered with a thin grayish slough and surrounded by a slight red areola. There were also one or two lesions on the dorsum of his tongue.

The cervical glands were not enlarged or tender. There was a slight mucopurulent post-nasal discharge present and some exudate could be seen in the left middle meatus. The left antrum was dull on transillumination.

The only other significant findings were in his chest. There was an area of depressed breath sounds, bronchovesicular in character, over the left anterior chest in the region of the 3rd and 4th interspaces, just medial to the anterior axillary line. An occasional râle was heard in this area.

Laboratory findings.—White blood cells 7,500; neutrophiles 75%; lymphocytes 16%; endocytes 7%; eosinophiles 2%; blood Wassermann, negative; cultures from exudate in eyes were negative, and from blebs showed only *S. viridans.* No Vincent's organisms were found. Spinal fluid negative.

X-ray examination of the chest showed a pneumonic process extending out from the left hilum. X-rays of sinuses showed cloudiness of left antrum.

To sum up, this young man who was quite well until October 1, 1943, developed an upper respiratory infection which localized into a mild sinusitis, but was never severe enough to interfere with his usual duties. Almost three weeks later, on October 18, a severe illness gradually came on, characterized by progressive constitutional symptoms, leading to admission to hospital on October 21. During his stay in hospital, except for the first 36 hours, the temperature remained between 103 and 104 degrees. The white blood cells averaged 12,000. Repeated blood cultures were negative and sputum cultures revealed only *Strep. viridans.* There were no tubercle bacilli or fungi present. Agglutination of blood for psittacosis antibodies was negative.

Clinical course.—Late in the evening of October 21, he was given a mild alkaline mouth wash and sedative. The following morning his white blood cells had risen to 13,000 with 80% polymorphonuclears and the patient seemed worse. He was unable to swallow even liquids because of his sore mouth. An intravenous of glucose and normal saline was started, and at 4 p.m. with his temperature 103 degrees, sodium sulfathiazole intravenously was started. He was given 4 gm. followed by 1 gm. four hours later.

About midnight the patient seemed much worse. His condition strongly suggested an overwhelming septicæmia. His skin was hot and clammy. He was cyanosed. Respirations were rapid and shallow and often irregular. He had developed a severe pulmonary œdema, with marked dyspnœa, expectoration of frothy pink sputum and bilateral bubbling râles. His temperature had risen to 107 degrees rectally. Pulse was 140 to 150 and almost imperceptible. His liver could not be palpated but his spleen seemed enlarged. His intravenous had been running slowly so that he only received 1,000 c.c. in the six hours. He was given oxygen, morphine and atropine and continuous alcohol sponges. With the belief that this was general septicæmia, penicillin was started.

Two hours later there was definite but slight improvement and his temperature had fallen to 105 degrees rectally. By the following morning the patient was definitely improved. His pulmonary œdema had subsided and the temperature had fallen to 103 degrees. The lesions in his mouth were unchanged, many of the blebs had ruptured and the resulting ulcers coalesced to form large patchy sloughing areas. There was no particular odour present.

Despite continuation of penicillin until the patient had received 1,000,000 units and general supportive care including plasma, multiple small blood transfusions, and continuous oxygen tent, the patient gradually went downhill. The area of pneumonia involvement increased. The cough became very productive with expectoration of large amounts of odourless thick creamy sputum. The patient died November 4, 13 days after admission.

CASE 2

Tpr. R.R.K., aged 19 years, was admitted to a military hospital at 1945 hours, March 1, 1944, complaining of sore mouth, throat and eyes, and malaise.

Ten days prior to admission he developed feverishness, chilliness and headache, with slight cough, and retrosternal "soreness" on coughing. His symptoms persisted, with intermittent low grade fever, usually higher in the evenings and anorexia. He reported to his unit medical officer on the first day of the illness, and received symptomatic treatment for an upper respiratory infection, with excused duty. He received no sulfonamide. Four to five days later the cough became slightly more severe, with thick greenish sputum, and he complained of coryza and sore throat with some dysphagia. Twenty-four hours before admission he noticed soreness of the inside of the mouth, more marked on eating. Shortly afterward his eyes began to run, and there was some soreness of the lids. No photophobia was present. On the following morning, prior to entering hospital, his eyelids were puffy and the right cheek and the lips were swollen. Malaise was moderate.

His R.M.O. reported that blebs and ulcers of the buccal mucosa and swelling of one cheek developed on February 29.

EXAMINATION ON ADMISSION

The patient was of average stature and good physique, and appeared moderately sick. Racking productive cough was present. The eyelids, right side of face, and lips were swollen; the lips were dry and beginning to show surface cracks. Temperature 102.4 degrees; pulse 94; respirations 20.

Head and neck.—Moderate blepharo-conjunctivitis was present, more severe in the right eye, with a seropurulent discharge. The mucous membrane of the mouth was inflamed and œdematous and covered on the larger part of its surface with a white membrane. In some areas of the buccal mucosa, tense clear vesicles about 0.5 cm. in diameter were present, in other areas the vesicles appeared deflated. The palate, where not covered by exudate, was a dusky red colour. The throat was inflamed and congested, and showed an adherent, heavy, white, post-nasal discharge. A few enlarged and tender anterior cervical lymph-nodes were palpable on the right side, and there was a soft induration of all the submandibular tissues.

Chest.—Lung resonance was normal, but breath sounds were harsh and generalized coarse and medium rhonchi were heard in both inspiratory and expiratory phases.

Other systems.—The cutaneous, general glandular, cardio-vascular, gastro-intestinal and central nervous systems showed no abnormal findings. Scar of recent vaccination was present.

An x-ray of the chest showed an area of infiltration, three inches in diameter, surrounding the descending markings in the left lung.

Blood hæmoglobin 102%. White cell count 16,800.

Progress notes.—(These are presented according to the day of illness rather than the day of hospitalization. The patient was admitted on the 10th day of his illness.) On the evening of the day of admission, the patient's temperature rose to 104°, pulse 120, respirations 26, and he appeared more ill. He was quite drowsy and required no sedative.

Eleventh day of illness.—General condition: temperature 103 to 104 degrees; pulse 120 to 130; respirations 22 to 26. In addition to the blepharo-conjunctivitis already noted, there was a slight deep periscleral injection in the right eye, but no loss in detail of iris. Pupils equal. Considerable sero-purulent discharge present. Stomatitis essentially unchanged. Swelling of eyelids, lips and right side of face slightly more marked. No changes in resonance of chest. Scattered sibilant rhonchi and medium crepitations in both lower lobes. No localizing signs.

Approximately three dozen papules present on arms, legs, feet and chest; most numerous on dorsum of feet. They varied in size from pinhead to 2 or 3 cm. in diameter; the majority carried a clear tense central vesicle, and were surrounded by a red areola of not more than 2 mm. in width. Palms and soles were free of lesions.

White blood cells 21,000; red blood cells 5,420,000; Hb. 94%. Differential: polymorphonuclears: mature forms 71%; band forms 4%; juveniles 1%; eosinophiles 2%; lymphocytes: large 14%; small 4%; monocytes 4%. Red blood cells and platelets appeared normal.

Smear from eyes: moderate number of white blood cells found. No organisms. Culture showed staphylococcus as contaminant. Smear from blister in mouth; no Vincent's organisms. Gram's stain: a few white blood cells and Gram-positive cocci. Blood culture negative.

Twelfth day of illness.—Temperature 99 to 104°; pulse 120; respirations 22 to 24. Appearance little changed. Not toxic. Conjunctival injection about the same. Dull redness and marked swelling of the eyelids. The whole stomatitis has become more intense, cheeks a little more swollen, and exudate in the mouth more uniformly confluent. Several hæmorrhagic spots were visible under the latter, and bleeding followed scraping of the membrane. Buccal vesicles have all ruptured. The posterior wall of the pharynx showed what appeared to be muco-pus rather than exudate. Nose much blocked by secretion. Profuse glairy tenacious sputum.

There were inspiratory and expiratory rhonchi, as of bronchial narrowing, and while breath sounds in the upper lobes seemed clear, those in the lower lobes, particularly toward the bases, were slightly diminished, slightly prolonged in both phases, and showed more sibilant rhonchi and crepitations in both phases. Rhonchi and crepitations were still diffuse.

Skin: A few vesicles showed collapsed summits, some looked more cloudy, and there were a number of fresh lesions, still mostly on the limbs. Red plaque areas up to 1 cm. across, on dorsum of toes, with irregular raised edges and flat surfaces without vesicles.

White blood cells 18,850; Hb. 108%.

Thirteenth day of illness.—Temperature 101 to 104°; pulse 120 to 140; respirations 26 to 28. Appearance moderately toxic. Was given nembutal gr. 3 the previous evening, and became quite irrational and disoriented through the night. Eyelids were very much swollen and red, conjunctivitis marked with slight chemosis, and free purulent discharge. Stomatitis more intense. The whole buccal, gingival, palatal and pharyngeal mucosa covered with opaque, white, cracked membranous exudate. Tongue coated with thick brownish fur, and breath fetid. Moderate trismus present. Lips dry, brown and cracking. Face considerably swollen with waxy appearance. Dysphagia not sufficient to prevent a good intake of fluid. Dyspnœa more marked and fingernails showed slight cyanotic shade. Pulmonary signs were unchanged.

A few old vesicles had flattened, presenting a thin brownish, wrinkled umbilication, surrounded by a 1 mm. zone of clear vesication. Some new vesicles apparent, none over 4 mm. in diameter, and none with an areola of more than 3 mm. width. Only two small vesicles on the back.

White blood cells 14,100; Hb. 102%. Blood sulfathiazole level 4 mgm. %. Smear and culture from aspirated clear vesicle showed no leucocyte and no visible growth after 48 hours' incubation. Smear from eye showed numerous white blood cells and some Gram-positive diphtheroids. A rare Gram-positive coccus. Culture from eye showed one colony of *Strep. hæmolyticus.*

Pathologist's report on necrotic tissue from mouth: The appearance is that of necrotic, often vacuolated tissue. With eosin stain in most areas the cell outlines have been lost. Nuclei are present but these are pyknotic in nature. Centrally there are a few masses of neutrophiles, along with round cells. The necrotic tissue appears to be of squamous epithelial type. There is no evidence of malignancy.

Eighteenth day of illness.—Temperature yesterday showed peak to 102°. Today temperature 99 to 100°. Much improved. Removed from seriously ill list.

From now on there was slow but steady improvement. The skin lesions dried up, but there was an obstinate balanitis.

Sixty-seventh day.—General condition excellent. Slight cough persisted and there were scattered rhonchi still present in both lower lobes. X-ray of chest showed that lung markings of left lower lobe still heavy and suggested some residual infiltration. Pigmentation of sites of skin lesions was still present, but fading. Skin of prepuce was healed; phimosis present, apparently the result largely of scarring.

The soldier was discharged from hospital. This patient was under care of Capt. T. McConnachie, R.C.A.M.C., and case report was compiled by him.

General Clinical Manifestations

The onset was gradual. In this series of cases it varied from four to fourteen days. During this period the patients did not feel completely well and many stated they felt as if they were getting a cold. Usually they complained of malaise, a slight headache and loss of appetite. Practically all had a slight cough accompanied by substernal soreness. At first the cough was non-productive.

Following the prodromal period, fever with temperatures of 100 to 104° occurred. At this stage the case was usually admitted to hospital, frequently with the diagnosis of influenza or upper respiratory infection. During the first two to three weeks of the illness the temperature remained continuously elevated.

After the rather insidious onset, these patients rapidly became acutely ill. Lesions in the mouth developed and progressed with amazing rapidity. The cough was more severe and was soon productive of glairy, mucopurulent sputum mixed with copious amounts of saliva. In a short space of time extreme difficulty was encountered in getting patients to take solid food, and often liquids, because of their extremely painful mouth lesions.

At the height of the disease the patient presented a typical picture. He was usually extremely prostrated, appeared apathetic and very toxic. His eyelids were swollen and the conjunctiva was acutely inflamed. The lips were dry and fissured, drooling saliva, and coughing was incessant. He had a high fever and resented being disturbed, especially to take fluids. The course of the disease was most often prolonged. In most cases, after ten to fourteen days, the patient gradually began to improve and the lesions regressed slowly and he proceeded to complete recovery. In a few, the toxicity was overwhelming, their pneumonia failed to resolve, progressed, and death ensued.

SYMPTOMS AND SIGNS

(*a*) *Acute conjunctivitis* was usually present on admission. It varied from a mild catarrhal involvement of the tarsal conjunctivæ to a severe suppurative conjunctivitis with purulent exudate pouring from both eyes and the patient complaining bitterly of pain and photophobia. In a few cases, membrane formation was noted on the tarsal conjunctivæ. Cultures taken from the eye lesions were nearly always sterile but in a few cases, Gram-positive diplococci were recovered.

(*b*) *Stomatitis.* — This was the outstanding feature of the disease. It was present in all the cases and was generally extremely widespread. It frequently involved a large part of the buccal mucosa, soft palate, uvula, tongue and nasopharynx. The onset and spread of the stomatitis was rapid and dramatic. It seemed to commence as a few blebs or bullæ scattered irregularly over the buccal mucosa. Most blebs were filled with clear straw-coloured liquid but others contained purulent material and still others were frankly hæmorrhagic. The blebs varied in size from 0.5 mm. to 1 cm. They multiplied rapidly and in sixteen to eighteen hours after their first appearance were widespread and plentiful. The blebs ruptured rapidly and in a day or two the mouth presented a remarkable picture. Almost everywhere could be seen large shallow superficial ulcers. Some were covered with grayish-white cheesy-like material; others might be clean with a dull red glairy base. These ulcers coalesced to form large raw areas.

The mouth involvement was extremely painful and easily constituted the patient's chief complaint. Within 24 hours of the onset of the stomatitis the patient was usually unable to take little or anything by mouth. Several of these patients were unable to take any nourishment by mouth and had to be sustained with intravenous fluids. In other cases, dehydration was averted only by supplemental intravenous fluids. The patient soon presented a typical appearance. He looked toxic and was quite apathetic. The lips were swollen, fissured and covered with brown crusts. There was an almost continual drooling of mucopurulent material from the mouth. Quite often this fluid was blood-tinged. Swallowing was very painful and in some the œsophagus seemed to be involved. Several patients had laryngeal involvement, many became hoarse and a few lost their voices completely for a few days. The mouth lesions healed slowly, finally becoming covered with normal epithelium.

(*c*) ***A cutaneous eruption*** was present in only 9 of these 17 cases. When the rash was present it was typical. The lesions were confined to the forearms, dorsum of the hands, on the feet and lower legs and scrotum. In some cases there were scattered lesions on the trunk and back, but these were few in number. The eruption consisted mainly of circular or annular macules varying in colour from pale pink to light red. They contained a small central or target-like area that was darker than the remainder, giving it a highly characteristic appearance. A few of these tiny pin-point centre areas formed definite blebs; others were merely slightly raised with a scaly appearance. No ulcers were produced as seen in the mouth lesions.

The skin lesions usually made their appearance suddenly in crops and involuted in about a week. They were never any source of discomfort to the patient. They were preceded by the mouth lesions. There seemed to be no direct relation between the skin eruption and the severity of the stomatitis or disease as a whole. One fatal case had no skin lesions.

(*d*) *Penile eruptions.*—These were a more constant finding than the skin lesions. They were present in 12 of the 17 cases. This lesion appeared to be similar to the shallow ulcerations in the mouth. Characteristically, there were two or three small ulcers on the glans, involving the urethral meatus, and there was a mucopurulent discharge present.

(*e*) *The chest findings* were particularly interesting. Previous reports made little or no

reference to them. It was considered that the respiratory involvement constituted an integral part of the syndrome and was quite often responsible for the mortality and the extended morbidity. In this series the most seriously ill were those with chest complications. In the two fatal cases the lung involvement appeared to be the chief cause of death. Fourteen of our 17 cases had at some time during the course of the disease some pulmonary involvement. The usual lesion was a pneumonic infiltration frequently proceeding outwards from the hilum. In all cases, increased bronchial markings were noted radiologically. In many cases the pneumonic lesion resembled the common atypical pneumonia, both clinically and radiologically. In the fatal cases, the pneumonic densities failed to resolve and finally spread to involve large areas of both lungs. All cases with pulmonary involvement had a distressing cough with expectoration of large amounts of glairy mucopurulent sputum.

LABORATORY FINDINGS

There were no characteristic laboratory findings. Most cases had a moderate leucocytosis, with an increase in polymorphonuclear leukocytes. The white blood count averaged 14,000 and the blood Wassermann was negative. Cold agglutination tests done on a few cases showed no significant change. Routine blood chemistry tests were within normal limits. As the disease progressed a mild secondary anæmia developed. There were no urinary findings other than a trace of albumen in some specimens at the height of the disease.

BACTERIOLOGY

Cultures of the conjunctival exudate were usually sterile but in a few, Gram-positive diplococci were recovered. The lesions in the mouth produced only common oral flora. Sputum studies were interesting in that stained smears showed large numbers of pale round mononuclear cells and relatively few polymorphonuclears and bacteria. Sputum cultures most frequently grew non-hæmolytic streptococci but occasionally a few pneumococci and hæmolytic streptococci were recovered. Cultures of the fluid removed from unruptured blebs in the mouth and on the skin were sterile. Repeated blood cultures always gave negative results. These studies did not reveal a bacteriological etiological factor in this syndrome.

Exhaustive virus studies were made from material obtained from unruptured bullæ in the oral mucosa and from blood, sputum and autopsy material. A virus was isolated from two cases but the identification of these viruses and proof that they were the etiological factors has as yet not been completed.

PATHOLOGY

The main pathological findings were confined to the mucous membranes. The most dramatic changes in the fatal cases were found in the lungs. Complete post-mortems were performed on the two fatal cases. The following is a summary of the findings in one case. They were both identical.

Both lungs were found to be almost completely consolidated. The gross appearance differed considerably from that of an ordinary broncho- or lobar-pneumonia. Microscopic study of these organs showed the inflammatory exudate, which was widespread throughout the lungs, to be of an essentially mononuclear type, pus cells being conspicuous by their rarity. Cultures taken from the various organs failed to reveal the presence of any significant organisms. Staphylococci were recovered from the maxillary sinuses and bronchi, but cultures from the heart blood were sterile. The pleural cavities contained a slight excess of cloudy straw-coloured liquid.

The gross appearance of both lungs was similar. They were heavy, the right weighing 1,850 gm. and the left 1,920. The pleural surfaces were of a dark reddish-gray colour, while a thick layer of loosely adherent creamy fibrin coated the base of the right and filled the interlobar septa on the left. The lungs were firm and meaty throughout, several areas of subcrepitant air containing tissue remained in the right middle lobe and in the apex of the left upper lobe. The cut surfaces failed to retract and the margins were sharp. The changes were fairly uniform throughout, the parenchyma assuming a peculiar reddish-gray solid appearance which was associated with a certain translucency making the delicate interlobar septa stand out fairly prominently. On pressure an excessive quantity of slightly frothy fluid oozed from the cut surfaces while thick creamy material could be squeezed from the smaller bronchi.

Although these changes were fairly uniform, it was noted that in some areas the consolidated lung was of a reddish-purplish hue while in the

air-containing portions, it was of a pale salmon-pink colour. These areas merged imperceptibly with one another. The bronchi contained a considerable quantity of thick creamy mucoid material although there was relatively little reddening of bronchial mucosa.

The peribronchial and mediastinal lymph glands were markedly enlarged while the soft tissues of mediastinum itself were œdematous. The trachea showed little on gross examination and appeared free of any ulceration or membrane. Liver showed typical cloudy swelling and spleen was small and rather soft. There were no other significant findings.

SUMMARY OF INCIDENCE OF TYPICAL FINDINGS

Hospital Number	*Days*	*Conjunctival involvement*	*Stomatitis*	*Skin lesion*	*Penile lesion*	*Chest involvement*	*Recovery*
1.....	30	Yes	Yes	Yes	Yes	Yes	Recovered
2.....	16	No	Yes	Yes	Yes	No	Recovered
3.....	68	Yes	Yes	No	No	Yes	Recovered
4.....	15	Yes	Yes	?	Yes	Yes	Recovered
5.....	24	Yes	Yes	Yes	Yes	Yes	Recovered
6.....	35	Yes	Yes	Yes	Yes	Yes	Recovered
7.....	35	Yes	Yes	Yes	No?	No?	Recovered
8.....	12	Yes	Yes	Yes	No?	No?	Recovered
9.....	12	Yes	Yes	Yes	Yes	Yes	Died
10.....	20	No	Yes	Yes	Yes	Yes	Recovered
11.....	20	Yes	Yes	Yes	Yes	Yes	Recovered
12.....	20	Yes	Yes	No	No	Yes	Recovered
13.....	40	Yes	Yes	Yes	Yes	Yes	Recovered
14.....	40	Yes	Yes	Yes	No	Yes	Recovered
15.....	40	Yes	Yes	No	Yes	Yes	Recovered
16.....	30	Yes	Yes	No	Yes	Yes	Recovered
17.....	20	Yes	Yes	No	Yes	Yes	Died

MICROSCOPIC EXAMINATION

All sections showed an essentially similar type of inflammatory reaction varying only in degree. Those taken from the air-containing crepitant areas of the lungs presented what was interpreted as the earliest, while sections from the grayish solid areas, which constituted the bulk of the lungs, showed the most advanced. In the earlier lesion the normal architectural structures were relatively well preserved. The alveolar walls showed only a slight degree of thickening as a result of engorgement of their contained capillaries. The alveolar lining cells were, however, considerably altered, being enormously swollen assuming a cuboidal form. For the most part these had been desquamated into the lumen of the alveoli. As the lesion advanced many of the alveoli became filled with homogeneous acidophilic albuminoid œdema fluid. The interlobular septa in the regions of relatively uninvolved lung were markedly œdematous and heavily infiltrated with lymphocytes and plasma cells as well as many large pale cells of an endothelial type. Sections from the more well developed areas of consolidation showed a fibrinous type of material to be appearing in the inter-alveolar exudate which now contained many inflammatory cells of an essentially mononuclear type. The bronchi in these areas were considerably altered, the lining epithelium being completely denuded while the lumen contained fibrinous and albuminoid material in which many lymphocytes, plasma cells, large pale macrophages and a few polymorphonuclears were present.

The bronchial and bronchiolar walls were infiltrated with similar inflammatory cells which were also present throughout the interalveolar septa. Scattered patches of alveoli were noted, containing large numbers of red blood cells as well as a few, extremely patchy in nature, areas of early involvement being intermingled with regions showing more advanced inflammatory changes. The latter, however, were definitely related to the distribution of the bronchi such as is seen in ordinary broncho-pneumonia. In the most advanced lesion there was extensive disintegration of the parenchymal structures including bronchial and alveolar walls. Here the low power picture was highly suggestive of multiple scattered confluent abscess-like lesions, though when studied under high power, the highly cellular infiltrates were made up almost exclusively of mononuclears. The vessels on the whole were well preserved though in many instances surrounded by halos of lymphocytes and plasma cells. Scattered through all sections were many patchy areas in which the alveolar phagocytes were enormously swollen by the presence of finely granular rusty brown intracellular pigment.

The pleural surfaces of all sections showed considerable thickening as result of œdema and deposition of fibrin-like material. In sections stained for bacteria, colonies of cocci were seen in several bronchi but none were seen in the pulmonary parenchyma proper. Sections from larger bronchi and trachea showed much of the lining epithelium to have been entirely desquamated and replaced by an acidophilic type of mucoid material. The submucosal tissues were slightly œdematous, markedly hyperæmic and densely infiltrated with lymphocytes and plasma cells. The peribronchial lymph nodes also showed a diffuse infiltration of similar inflammatory cells which filled the sinusoids and pulp spaces while the follicles were hyperplastic.

BUCCAL MUCOSA

Sections from the areas of ulceration in the mouth showed the floor of the ulcer to be composed of relatively clean submucosal fibrous tissue. The epithelium marginating the ulcers was extremely hyperplastic, heaped up and reduplicated to such an extent as to give it an almost neoplastic appearance. The submucosa throughout was hyperæmic, œdematous and infiltrated with lymphocytes and plasma cells. The ulcers appeared to have been the result of a relatively bland type of necrosis while the inflammatory process present was of an essentially non-specific type.

TREATMENT

At the present time there is no specific treatment for this disease. Sulfonamides seemed worse than useless, serving only to further de-

press and nauseate the patient. Penicillin was without effect. The two fatal cases were each given over a million units without appreciable benefit. Good nursing care was the mainstay of successful treatment. General supportive therapy was often required. Most cases became dehydrated because of their decreased intake resulting from the painful mouth lesions and because of the large quantities of fluid lost by hypersalivation. In the same way the store of electrolytes was depleted. Dehydration was overcome by intravenous glucose and saline. Hypoproteinæmia was combated by the use of frequent plasma and whole blood transfusions. Intravenous amino acids which are now available should prove helpful. Unlike some observers we noted no specific effect of whole blood transfusions.

Administration of potent vitamin concentrates at any stage of the disease, produced no benefits.

The mouth lesions were benefited most by frequent irrigations with lukewarm normal saline. Potassium permanganate, chlorate, hydrogen peroxide, gentian violet and sodium hypochlorate seemed irritating and less beneficial. The conjunctivitis gradually responded to boracic or saline irrigations followed by instillation of a few drops of fresh castor oil.

Etiology and Discussion

This syndrome is not as rare as formerly supposed. In the past few months, 17 cases have been identified in the Canadian military hospitals. No doubt some of the milder cases passed as Vincent's infection, others recognized only as interesting skin lesions, chiefly erythema multiforme, and still others, drug reactions.

This syndrome is a distinct clinical entity. The etiology is a matter for surmise only, at this stage, but many factors strongly suggest a virus attacking chiefly lung and mucous membrane, hence the term "mucosal respiratory syndrome". Erythema multiforme is an unsatisfactory designation as less than 50% ever have skin lesions.

The chest findings were an integral part of this syndrome and previous descriptions have failed to stress or even make note of them. It is the extent of the pulmonary involvement that determines the prognosis. It is indeed perplexing to say the least, to watch the gradual spread of the pneumonia despite the use of all known therapeutic procedures.

Drug reactions particularly to the sulfonamides have been incriminated by several writers as the cause of this syndrome. Many of these cases received some form of sulfonamide usually sulfathiazole, particularly in the early stages, but on the other hand over half of the cases received no medication whatever until the disease was well established. This syndrome had been described long before the advent of sulfa drugs. No common drug could be involved in our series.

Very careful, exhaustive bacterial studies were made on many of the 17 cases. There were no bacteria found from cultures of mucosal lesions, skin lesions, sputum, blood, or from various organs at autopsy which seemed of any significance. We concluded that there was no evidence that the disease is of bacterial origin.

It has been recently suggested that this disease was the result of a vitamin deficiency. The age group of these persons made this theory extremely unlikely. Many were previously quite well, living in army camps for a varying length of time, partaking of a well-balanced diet. It is true that in advanced stages of this disease there must be a multi-vitamin deficiency due to the markedly restricted intake of these patients produced by the nature of the lesions. Large doses of potent vitamin concentrates did not significantly alter the course of these cases at any stage of the illness.

In favour of a virus as an etiological agent, we have lack of response to chemotherapy, characteristic type of cellular infiltration and failure to find a common bacteriological agent. Virus studies, being conducted on laboratory animals, though suggestive, are not yet completed.

Prognosis

The disease was generally severe, the majority of patients being acutely ill. Two of the 17 cases were fatal, a mortality rate of 11%. Hospitalization averaged 29 days. Unfortunately, all patients were not questioned specifically as to previous attacks, but four cases, gave a history of former attacks and one patient had three recurrences while in military service.

Conclusion

1. Seventeen cases of mucosal respiratory syndrome are reported. The disease is not as rare as is commonly supposed.

2. The various lesions of the mucous membrane, skin and lung are described.

3. Etiological and pathological studies failed to reveal any bacteriological origin and suggested that the disease may be due to a virus.

4. Specific treatment by sulfonamides and large doses of penicillin was of no value.

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RÉSUMÉ

L'affection décrite sous le nom de "syndrôme respiratoire miqueux" est une maladie fébrile rendant les malades qui en sont atteints rapidement adynamiques, intéressant les muqueuses des conjonctives et de la bouche, et présentant des éruptions cutanées irrégulières, des lésions péniennes et une pneumonie. Sur 17 cas rapportés 2 sont morts. Les épreuves de laboratoire sont négatives ou renseignent peu. L'agent causal n'est pas connu mais il est vraisemblablement un virus. Les sulfamidés et la pénicilline sont inopérants.

JEAN SAUCIER

THE PLACE OF PROTEIN IN THE DIET OF THE PREGNANT PATIENT

By Murray Blair, M.D.C.M., Merle Turnbull Porter, B.A., B.H.Sc.* and Lyle A. Atkinson, M.S.A.†

Vancouver

UNTIL recent years too little attention has been given to the importance of protein in the diet of pregnant patients. Indeed it might be said that our general knowledge of protein metabolism in its relationship to obstetrical diets has lagged behind that of other food constituents. The training of students only a few years ago was that, at the appearance of increased blood pressure, œdema, or proteinuria, meat, fish, eggs, and other protein producing foods were eliminated. Today, as a profession, we are more cognizant of the vital rôle of protein in the diet, and especially in the diet of our pregnancy cases.

* Assistant Director of Dietetics, Vancouver General Hospital.

† Director Laboratories, Fraser Valley Milk Producers Association.

From the Department of Obstetrics and Gynæcology, Vancouver General Hospital.

Protein is essential to growth and growth of course begins with conception, not birth. We occidentals derive our protein for ourselves and our unborn progeny from the protein of animals rather than from that of the cereal grains. We are a taller and better proportioned people than our oriental neighbours, perhaps chiefly because of the animal protein in our diets. As Slonacker puts it, "Those races of tall stature and most perfect physique live on diets rich in protein, with meat forming a conspicuous part."

The protein need of the average case during the last half of her pregnancy has been estimated by the Committee of Foods and Nutrition of the U.S. National Research Council at 85 grams per day. It is our opinion that the above figure should be taken as a minimum. A safer figure is 100 grams a day and a still safe and sound objective is 120 grams a day. To keep the protein intake at a high level is not easy. It is not the pleasantest or tastiest part of the diet. It unfortunately composes the most expensive part and so there is a decided tendency to cut down on meat, fish, eggs, milk, etc., as costs go up.

It is perhaps elementary to point out the three basic causes of protein deficiency, concerning all of which we must be on our guard.

1. *Lowered protein intake.*—It has been deeply ingrained in the profession over the years that the pregnancy case needs little protein and that at the first sign of trouble, protein should be reduced. Only in recent years and at long last have we realized that protein in quantity is not only necessary but essential to the pregnant state. We know of no condition or complication in pregnancy except eclampsia itself that should suggest a lowered protein intake.

2. *Increased protein need.*—The commonest example of increased protein need is growth. In the first three months of pregnancy the protein need would be that of the mother and little more. As the fetus develops the protein need increases, until in the last trimester protein intake is essential and lack of it may be a party to the majority of our troubles. Indeed, it is probable that a lack of protein need during the late stages of pregnancy may affect the fetus to a greater extent than the mother.

Instructive studies by Burke *et al.* suggest a definite relationship between the protein content of the mother's diet and the birth length and the birth weight of the baby. Those mothers with

adequate protein intake had slightly longer and larger babies. However, the length of labour in those cases with adequate protein and slightly larger babies was the same as in those with inadequate protein intake and smaller babies. The same study also showed that those mothers with an adequate protein intake had fewer complications during their pregnancies, fewer premature deliveries, fewer toxæmias and fewer stillbirths. There is apparently no relationship between prenatal nutrition and the duration and character of subsequent labour.

3. *Increased protein loss.* — The commonest form of protein loss is its excretion through the kidneys. To explain the reason why the kidney suddenly permits protein, chiefly albumin, to pass through glomeruli where normally little or none was allowed to pass would be to unlock at least part of the mystery of toxæmic pregnancy. It should be remembered that the kidney lesion found in the normal pregnancy which becomes toxic is a part of the general arteriolar spasm. There is no inflammation of kidney tissue and no degeneration. There is probably a spasm of the afferent arterioles of the glomeruli which causes the protein spill. Subsequent pregnancies we know may show no proteinuria. Autopsy usually discloses little kidney disease. The point we would make is that the appearance of proteinuria should not be the signal to lower the protein intake but should stimulate us to see that plasma proteins are kept up despite the protein loss through the kidneys.

SERUM PROTEIN, WATER BALANCE, ŒDEMA

This interesting trilogy is well known to all students of toxæmic pregnancy.

The osmotic pressure of a solution is a measure of the concentration of active chemical components in the solution. It is an expression of the proportion of water to solids, or the degree of dilution. Membranes surrounding cells permit free exchange of water and some compounds or electrolytes of small molecular size. However compounds of large molecular size cannot pass through these membranes. Chief of these latter entities is protein.

In considering and understanding water balance in the body, we must think of the entire body structure as divided into two compartments — intracellular and extracellular. The extracellular compartment is again divided into intravascular and extravascular. It is with these two divisions of the extracellular compartments that we are concerned. The fluid in the intravascular compartment is known as blood and lymph. The fluid in the extravascular compartment is known as interstitial fluid. An overabundance of the latter is referred to as œdema. Now when solutes, such as protein, reach the blood stream and remain intravascular until the concentration becomes appreciably greater than the concentration extravascularly, or in other words greater than the osmotic pressure of the extravascular fluid outside, there is a natural tendency to equalize dilutions or concentrations within and without. Thus the movement of extravascular fluid is toward the blood and lymph of the intravascular stream. As this hypothesis would suggest, and as Dexter and Weiss have observed, the lower the serum proteins, particularly albumin, in the intravascular system, the greater the œdema; and conversely, as the intravascular serum proteins increase the œdema disappears.

It must be added at once that hypoproteinæmia is not the complete explanation for œdema. That some elusive antidiuretic substance will be found present in the mother and not in the fetus is suggested by many. Suffice it to say that water balance and the vital part played by serum protein on extravascular fluid or œdema is a directive pointing the way to sane dietary treatment of the pregnant woman, be she normal or toxæmic.

ANÆMIA

The tendency of pregnancy patients to become anæmic during the last six months of pregnancy is common knowledge. That there is a relationship between digestive disorders and anæmia is, we believe, generally accepted. Whipple has shown in a study of dogs that there is a relationship between low protein intake and low hæmoglobin. Bibb has demonstrated that the same trend applies in pregnancy cases. Where there is adequate protein intake in the diet, there is more likely to be adequate hæmoglobin content in the blood.

LACTATION

Any addition to the diet that might increase lactation would surely be a welcome contribution. Human milk is produced with a standard protein content and this content does not vary to any appreciable extent. It should also be remembered that milk, whatever its source, is predominantly a protein food, and is so listed

by both pædiatricians and dietitians. As milk is not produced with less than standard protein content it seems reasonable to postulate that the lactating mother produces only as much milk as she has available protein. It is not at all suggested that lack of protein is the answer to our modern failure to breast-feed our progeny. It is suggested that lack of sufficient protein in the maternal diet may be one of the reasons for our persistent and consistent failure to make our nursing mothers successful producers of milk.

This hospital is not equipped for research and so definite findings cannot be stated. However, in the last 400 private cases, all of whom have received a diet rich in protein during their pregnancy and lactation we believe there has been an improvement in the supply of breast milk.

PROTEIN IN THE DIET

To keep the protein intake at a higher level (120 to 140 grams a day) is not easy. Protein is not the pleasantest or tastiest part of the diet, but it is the most expensive part and so there is a decided tendency to cut down on protein as costs go up. Moreover the average sedentary female patient often does not take kindly to the diet which demands much meat and fish, much milk and many eggs. We find, indeed, that few women will accept or can accept the heavy meals that high protein demands. The woman who does not like milk simply cannot take it.

It was therefore found necessary to cast about for some method of protein intake other than food. Many commercial amino-acid products were examined and rejected because of taste, odour or price.

USE OF SKIM MILK POWDER

It is generally agreed that protein derived from animal sources is of greater biological value to the human than that derived from cereals or vegetables. Consultation with authorities in commercial milk plants revealed that skim milk powder (spray) most nearly met the need. Skim milk powder is made commercially by most of the big dairy industries and is used in quantity by the baking and ice cream industries. As a result the product is cheap as well as tasteless and odourless. Skim milk powder is known in the dairy industry under the term "dry milk solids".

The use of spray process dried milk solids is recommended over that of roller process or drum-dried because of its superior solubility and digestibility. Both of these factors are enhanced by the fact that in the spray process the powder particle is spherical in form, being a dried droplet of milk, and thereby offers a greater exposure to both solvents and digestive ferments.

The product we have used is marketed under the trade name "Milksno" and is made by a local company. We are assured by them that it is probably identical with the skim milk powders (spray) made by similar milk companies and marketed under various trade names. The average composition of skim milk powder (spray process) is:

Lactose	53.0%
Protein	34.0%
Fat	1.25%
Ash	7.5%
Moisture	3.0%

The protein content is 2.41 grams per level tablespoon. Four level tablespoons is about an ounce by weight, so that one ounce of skim milk powder adds 10 grams of protein to the diet. It is agreed by most patients that the addition of the powder to milk or in any other way does not affect the taste to any appreciable extent.

To assist the patient to increase her protein intake the Department of Dietetics of the Vancouver General Hospital evolved a set of recipes using skim milk powder. These recipes have been tested and found practical. The variety of methods of using skim milk powder are unlimited and the product is included in both cooked and uncooked recipes.

The product is decidedly inexpensive. It is prescribed only for those patients who find it hard to keep up their 120 gram protein intake per day. More than half our patients need no such assistance. We suggest that as a general rule patients who need "protein assistance" should take 8 to 10 level tablespoons a day or about 25 grams of extra protein. In this way we believe her protein is kept up, her weight down and œdema becomes a rarity.

How much protein does the patient take?—The answer must of course be that we do not know exactly. Pregnancy patients at home, whether well or sick, do not weigh their food. For that reason diets *per se* are of minor value. Certainly, the obstetrician who hands out a prescribed diet and lets it go at that has little idea of his patient's actual food consumption. As a guide, it may be said that 1 serving of meat, 2 eggs, 1 quart of milk, a bit of cheese,

together with the usual vegetables, fruit and cereals, will supply 100 grams of protein. We have felt for years that the only way we can hope to keep the protein content up is to discuss it with the patient and emphasize it every time we see her. One gets results by first suggesting but finally insisting.

We present then a high protein diet which we have used consistently. We believe it is practical because it is edible. The high protein, high carbohydrate, low fat—yet ample calorie content should be noted.

DIET IN PREGNANCY

Protein, 120 grams; fat, 50 grams; carbohydrate, 300 grams; calories, 2,130.

1. *Avoid excessive salt.*—Use a minimum of salt in cooking and do not add salt at the table. Avoid salty foods such as bacon, ham, finnan haddie, salted soda crackers, and salted nuts.

2. *Avoid fried foods,* and *rich foods* such as pastries, gravy, extra butter, *rich* milk, cream, cream cheese, mayonnaise, chocolate and nuts. Remove two-thirds of the cream from the milk.

3. *Include large amounts of protein* in the form of lean meats, fish and fowl, eggs, cheese and milk.

DAILY MENU

Breakfast:
- Fruit juice, 1 glass, or stewed fruit, ½ cup or 1 large orange or ½ grapefruit.
- Cooked cereal, ½ cup with milk and sugar.
- Egg, 1, cooked in any form except with added fat.
- Brown bread toasted, 1½ slices.
- Butter, 1 teaspoon.
- Jam or jelly, 1 teaspoon.
- Milk, 1 glass (6 oz.).
- Tea or coffee, if desired.

10.00 a.m.:
- Milk, 1 glass.

Lunch:
- Lean meat or fish or chicken, large serving.
- Vegetables, 2 servings, either cooked or raw.
- Potato, 1 serving.
- Brown bread, 1½ slices.
- Butter, 1 teaspoon.
- Plain milk pudding, 1 serving (rice, custard, tapioca, sago, blanc mange or jello).
- Milk, 1 glass (6 oz.).
- Tea, if desired.

2.00 p.m.:
- Tea or ginger ale, 2 arrowroot biscuits or plain cookies.

Supper:
- Lean meat or fish or chicken, 1 large serving or cottage cheese, ½ cup.
- Vegetables, 2 servings or vegetable salad, 1 large serving.
- Potato, 1 serving.
- Brown bread, 1½ slices.
- Butter, 1 teaspoon.
- Preserved fruit, 1 large serving.
- Milk, 1 glass (6 oz.).
- Tea, if desired.

Before retiring:
- Ovaltine, cocoa, or tea.
- Bread, 1½ slices.
- Butter, 1 teaspoon.
- Jam, 1 teaspoon.

Substitution:
- One egg equals one 1" cube Cheddar cheese (mild).

If the patient is not keeping up or improving on such protein intake then we suggest the addition of skim milk powder.

Can the patient take too much protein?—There is no doubt that any good thing can be overdone. Exponents of balanced diets and neutral diets suggest that an acid ash causes trouble as does an alkaline ash. In a moderate experience of some 600 cases with a diet rich in protein we have not seen a case in which we thought too much protein had been given. If she had too much we did not realize it. It seems doubtful that the average occidental who comprises the average practice is in much danger of ingesting more protein than she can handle.

CONCLUSIONS

1. A plea is made for a pregnancy diet rich in protein.

2. As a "meat eating" people both the pregnant woman and her unborn child need a plentiful supply of protein.

3. The relation of water balance and œdema to the toxæmias of pregnancy is discussed. The importance of serum protein and its direct relationship to œdema is emphasized.

4. A diet which is relatively protein high, fat low and salt poor is presented.

5. A method of complementary protein feeding by means of skim milk powder (spray method) is offered.

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RÉSUMÉ

La femme enceinte doit consommer dans la dernière moitié de sa grossesse au moins 85 gm. de protéines par jour, et de préférence 100 à 120 gm. Les 3 causes de déficience protéinique sont (1) l'ingestion insuffisante de protéines; (2) le besoin accru de cette variété d'aliment, et (3) sa déperdition accélérée. Rappelons-nous que plus les protéines du sérum sont réduites dans le système intravasculaire plus considérable sera l'œdème, par simple phénomène d'équilibre osmotique. On sait également que l'anémie est liée à l'insuffisance protéinique. La lactation est une fonction qui requiert une prise abondante de protéines; cette notion trop souvent ignorée ne cesse encore d'étonner. Un régime relativement élevé en protéines, pauvre en graisse et en sel convient bien à la femme enceinte; à ce régime pourra s'ajouter, au besoin, de la poudre de lait écrémé.

JEAN SAUCIER

MANAGEMENT OF NERVE INJURIES IN THE LATE STAGES*

By Frank Turnbull, M.D.

Vancouver

MOST of the recent clinical and research studies on the subject of nerve injuries have dealt with the problems of treatment in the early stages. Recognition of the great importance of early definitive surgery has focussed attention on this phase of the work. Yet there still remains a large proportion of patients for whom definitive surgery has to be delayed. Nearly all the cases that we are called upon to treat, in our neurosurgical centres at home, are these cases of nerve injury in the late stages.

Some brief comments about early definitive surgery will serve as a background for the subject under discussion. Suture of transected nerves is never indicated at the primary operation in war surgery, and probably seldom in peace-time surgery. But if more than a month, or at the outside, two months, are allowed to elapse before definitive surgery is performed, one may jeopardize the chances of ideal recovery. Penicillin and the sulfonamides have reduced the fear of stirring up latent infection in recently healed war wounds. The old dictum of waiting six months before attempting secondary suture of a nerve is no longer tenable. A delay of a month or two after wounding will allow for healing of the soft tissue wounds in many cases and provide time for transport to a centre where the best technique may be employed. It is not always necessary to postpone secondary suture because there is an associated fracture. Operation on the nerve will not prejudice union of the bone. The custom of waiting for the fracture to heal may deny the patient any real chance of success from nerve suture.

GENERAL REMARKS

The observations in this paper apply particularly to the casualties of war. The cases under consideration are those patients in whom secondary suture of the nerve has been deferred. This delay of definitive surgery may have resulted from several factors, either singly or in combination. Lack of special facilities, the difficulties of transport, and above all, the association of gross injuries of soft tissue and bone, have led to the postponement of operation on the injured nerves.

Patients on whom secondary suture has to be delayed for many months commonly have more extensive scars than patients whose limbs are ready for secondary suture at an early stage. Moreover, the scars are usually much denser in the late cases. Superficial closing over of a wound is no indication of the end-stage in soft tissue healing. The density of the underlying fibrous tissue increases considerably in the subsequent months. Surgeons who have had much experience with early secondary suture frequently remark about the relative absence of dense scarring, and the consequent ease of dissection. This is particularly evident in dissections of the brachial plexus.

Skin grafting is often necessary to secure healing over raw areas that cover injured nerves. The type of skin graft that is employed requires careful consideration. Principles that determine this choice are not always identical with the tenets of general surgery. Pinch-grafting over injured nerves should be reserved for cases in which the nerve injury is known to be irreparable. No surgeon would cover with pinch-grafts a nerve that will require subsequent exploration for secondary suture. To cover over a nerve lesion "in continuity" may be almost as serious a mistake. Subsequent contraction of the grafted area may cause further harm to the nerve and if re-exploration is necessary the graft will need to be resected. When operative repair of an injured nerve has to be deferred it is preferable to cover a raw area by swinging a flap or using a full thickness graft. Occasionally the secondary suture and skin grafting can be combined in one operation. If the nerve is found to be irreparable, pinch-grafts may be substituted for the more time-consuming full thickness graft.

Rigidity of knee, elbow or shoulder joints, that results from plaster casts, frequently delays and occasionally prevents, a secondary nerve suture. It may be impossible to obtain sufficient flexion of these joints to ensure suture without tension, even with extensive mobilization of the nerve. It is not fitting for a neuro-

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Chief of Staff, Combined Services Neurosurgical Centre, Shaughnessy Hospital, Vancouver, B.C.

surgeon to venture any opinion in the controversy about the relative value of "pins alone" vs. "rigid plaster casts" for the treatment of fractures of the extremities. Nevertheless it is fair enough to point out that any method of fixation of fracture that allows continued mobility of adjacent joints, has decided advantages in cases of nerve injury.

There may be indications for exploring a nerve in the late stages that are irrespective of the functional state of the nerve.[1] In general, the objective of these operations is to secure as good a permanent bed for the nerve as possible. The history of prolonged infection in a wound indicates the probability that the nerve is surrounded by constricting scars. The story of unusual bleeding from a muscle, or of a closed crushing type of injury suggests that there has been local necrosis of muscle with subsequent strangling of the nerve in scar tissue. Excision of the scar and transposition of the nerve into adjacent healthy tissue planes is indicated in these cases. When the nerve lies at the bottom of a healed "trough", it should be freed and the skin and deep tissues brought over the hollow. Prof. Learmonth, who has had a large experience with arterial lesions, believes that when a nerve or nerves and the main artery of a limb have been injured at the same level, the nerves should be dissected from the scar and the thrombosed segment of artery resected. He also advocates that in such instances a preganglionic sympathectomy should be performed before axons from the regenerating nerves reach the digits, to prevent the reimposition of vasoconstrictor tone on the digital vessels.

When exploration of a nerve in the late stages reveals an appearance of continuity there seems to be just as much indication for conservatism as in the early stages. The "feel" of the nerve is not an infallible indication of the existence of an impenetrable barrier of fibrous tissue. The presence or absence of a fusiform neuroma is not a safe criterion. Denny-Brown and Brenner's experiments[2] have demonstrated that a nerve which is injured by percussion may form a "pseudo-neuroma" at the site of injury which may persist as long as three months. And yet excellent regeneration can occur in such cases. Furthermore, even the absence of response to faradic stimulation may not rule out spontaneous recovery. Livingston[3] has recently reported three instances of spontaneous recovery of nerves which, at operation more than five months after wounding, had failed to show any motor response to a gross faradic stimulus. A decision about resection of these nerve lesions "in continuity" entails an appraisal of the cause and anatomical site of the wound as well as the gross appearance, and behaviour to electrical stimulus, at operation. The frequency of spontaneous recovery after injury by high-velocity missiles is a point that should be kept in mind.

Re-exploration of a nerve which has already been sutured is a different matter. Having once performed a suture there is a tendency to be unduly conservative about subsequent explorations. I confess that I have usually found it easier to undo the handiwork of others than my own. But I have been more self-critical since reading the comment of a competent medical observer[4] who remarked that it did not seem to him to matter much who performed the suture, insofar as end-results were concerned. Lt.-Col. Spurling, senior neurosurgeon of the American Army, has repeatedly stressed the importance of considering re-exploration and, if necessary, resuture, if recovery does not proceed on schedule. It is better to explore and see the exact state of affairs, than to wait and hope.

The surgeon who performs a delayed secondary suture of a peripheral nerve has an obligation on himself not to add any unnecessary disfigurement to an already badly insulted limb. If one can accomplish little or nothing in respect to function, as is frequently the case, one may at least take sufficient time to leave an operative scar that is not an æsthetic horror. In this respect the plastic surgeons have taught us the importance of preventing keloid formation by using S-shaped incisions, that follow the natural skin creases, when one's incisions cross the flexor surface of joints.

PSYCHOLOGICAL PROBLEMS

The results of treatment in the late stages are often adversely affected by the patient's state of mind. Some men return from overseas with a child-like faith in our ability to "stitch the nerves together", a process which in their minds is almost synonymous with restoring normal function. Other patients seem to have a supreme indifference about the outcome of

future surgery. The paralyzed limb is a symbol of what they have suffered. Come what may, they know that disability means a pension and at least relative security in the future. These attitudes are not often encountered in an extreme form, but they appear in varying degrees in many of our patients.

The expectation of a miraculous recovery after operation on nerves is noted most frequently in the upper limb injuries, and usually in the most hopeless cases. The initial examination may quickly establish the hopelessness of the situation in the examiner's mind, but this is a poor time to discuss prognosis with the patient. He is particularly "allergic" to any suggestion about partial amputation and the use of a prosthesis. His hope of sensational cure does not seem to result from misinformation as much as it seems to express an unconscious fear of amputation. It is preferable to postpone any dogmatic prognosis until after the nerves have been explored. A simple exploration will satisfy the patient that the surgeon's opinion about the state of affairs is founded on actual observation, and not on uncertain judgment.

An attitude of indifference about recovery may be difficult to combat. The patient has noted the orderly progress of healing of his soft tissues and bones, but now, months later, he has to admit that there has been no improvement in the function of his nerve since the day of the wounding. If the affected nerve has been the radial or external popliteal, and the wrist drop or foot drop has been adequately supported, he can readily envisage a good recovery. But if he has suffered a lesion of either median or ulnar nerve there probably has not been the same adequate splinting and the sensory deficit is more obvious. He is prone to accept his partial loss of function as a permanent disability. There may indeed be little chance of satisfactory nerve regeneration with secondary suture. But the surgeon will block a very important road to functional recovery if he restricts his discussions about prognosis to the chances of regeneration of the nerve *per se*, and does not stress the value and importance of rehabilitation of the limb as a whole.

We are indebted to the Russians for stressing the concept of rehabilitation of the limb as a whole in peripheral nerve injury. A recent article by Luria[5] seems to explain why the Russians can be so enthusiastic about recovery, even after freak operations that include the use of alcohol-fixed cadaver grafts. It is apparent from a study of this article that they put little emphasis on recovery of function in the nerve that has been divided. They stress a type of exercise and mechanical training that will teach the patient how to overcome his handicap. Trick movements are purposely developed and encouraged. A man with a rigid claw hand is provided with tools which have special handles that can be firmly held in this type of hand. Then with the aid of these handles on his tools the man finds that he can keep up with his fellow workmen who have two normal hands. For patients with wrist drops, tools such as hammers are provided with long handles that tuck under the upper arm and provide stability.

THE FIRST APPROACH IN PROGNOSIS

We have seldom had an opportunity in our Centre of performing nerve suture less than three months after injury, and the delay in the majority has been six months or longer. There were not many cases until this past year, so that we cannot yet assess our end-results. But we know fairly well what to expect, because reports are now appearing from British centres of large series of cases treated during the early stages of the war.[4] These reports deal by and large with patients who were treated in the late stages, *i.e.*, six months or more after injury. The end-results are no better than those reported after the first World War. This sounds discouraging until we stop to consider that the organization for treatment of nerve injury cases during the first few years of this war was largely based on the experiences of the last war. Between 1919 and 1939 there was very little advance in our knowledge of how to treat nerve injuries. There seems to be good reason to hope for more cheerful reports about cases that have been treated during the past two years, particularly from those centres where early secondary suture has been practiced on a large scale.

Most of us never had, nor ever will have the huge individual experience in nerve suture that has been the lot of a few surgeons in England and America. For us, these early British reports are of great value, because they at least establish a base-line in respect to nerve injuries which are treated in the late stages. We can strive to do better, but there is nothing to be

gained by looking at the problem through rose-tinted glasses. A knowledge of the limitations in the late surgical treatment of each of the important peripheral nerves may be of more value in determining the proper course of therapy than a blind faith in one's surgical ability.

SCIATIC NERVE

To a certain extent the results of nerve suture vary inversely with the size of the nerve and the distance from the periphery. At least this seems to hold true for the sciatic nerve. I am not aware of any well authenticated case of even reasonably good results following suture in the upper thigh after a delay of four months or longer. In the majority of cases there is total failure. At the same stage a suture of the sciatic nerve in mid-thigh offers a hope of some recovery of the long plantar flexors of the foot and perhaps a crude sort of sensation in the sole. The results of suture in the lower thigh are more hopeful.

For reasons which are not entirely clear, suture of the external popliteal division of the sciatic nerve (at any level) offers the worst prognosis of any major peripheral nerve in the body. Fortunately, the motor handicap that results from the loss of the external popliteal nerve can be fairly well overcome by a brace or tenodesis, and loss of sensation on the dorsum of the foot is not a serious handicap. These considerations have prompted a few surgeons to use a portion of the external popliteal division as an autograft to bridge long defects of the internal popliteal. I have employed this method in two cases, but too recently to report the result. They served at least to demonstrate the discrepancy in size of the two divisions, for cross-section of the internal was almost twice the cross-section of the external division.

An irreparable lesion of the sciatic nerve, or secondary suture that has been a total failure, does not always leave the patient with a useless leg. If the man has well-fitted braces and shoes, takes special care of his anæsthetic foot to prevent ulceration, and has a sedentary job, he may get along fairly well and be satisfied that at least he is using his own leg. A partial lesion or a partial recovery may prove to be even more incapacitating. The unbalanced action of a few muscles in his lower leg may cause troublesome deformity and frequently contractures develop before he is able to start walking. Many of these contractures can be prevented by judicious splinting, but frequently they develop in the early stages when pain in the calf muscles and hypersensitivity of the foot prevent manipulation and firm support. More disabling than the recurrent ulcers, and the contractures, is the pain and hypersensitivity that so frequently are encountered in lesions of this nerve. A partial recovery of sensation may be no blessing, for it may only be the source of miserable aching and parasthæsia.

If the end-result of treatment is a partially deformed and painful foot, the man may fare much better with an amputation and properly fitted prosthesis. Brigadier Bristow of the British Army, whose experience with these lesions has been vast, is very critical of an end-result which does not allow the man to walk more than a mile without discomfort. In such cases, he offers amputation to the patient "not as a threat but as a promise". There need be no haste about amputation. If the patient arrives at the decision of his own free will, he will probably have a greater urge to adapt himself quickly to an artificial limb.

RADIAL NERVE

The situation in respect to the late repair of radial nerve lesions is ironical. No peripheral nerve shows a higher rate of recovery after suture, yet no peripheral nerve injury, if irreparable, can be so adequately treated by tendon transfer. The knowledge that a properly executed tendon transfer for a radial nerve palsy will restore about 80% of function, makes late secondary suture a wasted effort and an economic loss for the patient, unless the suture can be accomplished easily and without tension. Transplanting the nerve around the humerus may gain the necessary length but is unwise if it jeopardizes the nerve supply of a weakened triceps muscle. Shortening the bone to obtain end-to-end suture is not justified with an intact humerus but can frequently be employed in cases of mal-union or non-union. To employ bone-graft without at the same time attempting suture of the nerve, when the length of bone resected can be so nicely adjusted to the needs of the suture, is the height of folly. I have encountered such cases, and subsequent nerve suture proved to be impractical because of scar and the difficulties of mobilization. It is impossible for me to understand the rationale of combining suture of the nerve with tendon

transplant at the wrist, a suggestion that I have frequently overheard but never witnessed in practice. The procedure seems to imply a mixture of optimism and pessimism in the surgeon's mind that is tantamount to a split-personality.

MEDIAN NERVE

A total lesion of the median nerve may produce surprisingly little motor defect. There will be almost total loss of flexion of the index finger and loss of ability to flex the terminal phalanx of the thumb. But action of the ulnar nerve may provide a reasonably good grip, and there is no deformity of the hand. If the lesion of the median nerve has been below the mid-forearm the only practical motor disability is in respect to opposition of the thumb. This is often overcome to a large extent by trick movements of muscles supplied by the ulnar nerve. The chief disability that results from all median nerve lesions and the only practical disability when the lesion is distal to the mid-forearm, is loss of sensation over the index finger and tip of the thumb.

Median nerve lesions above the middle of the upper arm are commonly associated with lesions of the ulnar nerve and less frequently the radial nerve. There may be an associated fracture of the humerus and also injury of the axillary or brachial artery. In the late stages such cases usually present themselves with not only extensive scarring but contractures and rigidity around the shoulder joint that make exploration difficult or impossible. Median nerve lesions of the upper forearm are often associated with such scarring and so much gross destruction of adjacent muscles that exposure is difficult and successful suture offers no hope of recovery of the long flexor muscles. If secondary suture is impractical in these cases one might consider tendon transfer to improve motor function, but only after a long trial of physical training.

One is still left with the problem of anæsthesia of the index finger and thumb. Col. R. I. Harris,[6] after the last war, reported a case in which he had restored sensory function to the index finger by anastomosis of the radial to the median nerve just above the wrist. The procedure has probably been tried by others, but the possibilities of this operation have not been thoroughly investigated. The first patient on whom I tried this operation has very little return of sensory function after ten months. There is a subjective improvement in the "feeling" of the index finger which is hard to assess, but the only objective sign is recovery of position sense in the distal joint. The operation was not satisfactory from a technical point, chiefly because the radial nerve was severed distal to its level of branching with resultant difficulty of obtaining good apposition with suture. I am now trying the operation with plasma suture on a selected group of these patients. It seems to offer some hope and at least causes no practical harm.

ULNAR NERVE

The same general situations are encountered with the ulnar as with the median nerve and need not be recapitulated. In contrast to the median nerve the chief disability that results from a total ulnar palsy, in respect to function of the hand, is the motor deficit. Flexion contracture of the ring and little fingers may be a serious handicap. This deformity is usually worse in the forearm injuries than in the upper arm injuries because the pull of an active profundus digitorum muscle is still present with the distal lesions. A "knuckle-duster" splint theoretically relaxes the paralyzed lumbrical muscles but I am not yet convinced that it has any practical value for the prevention of this deformity. In spite of our injunctions most of the patients carry the splint almost as much in their pocket as they do on their hand. When an extreme and rigid contracture of the little finger develops the function of the hand may be considerably improved by amputation of the finger, which is not only deformed but insensitive. I have not had any experience with plastic or tendon transfer operations for correction of the deformity when there is no contracture.

REHABILITATION

Broadly speaking, there are two methods of handling the rehabilitation of service personnel who have suffered peripheral nerve injuries. One method is to keep the patients continuously in hospital until end-stage of recovery has been attained. The other method is to keep the patient in hospital only long enough to complete active surgical therapy and to have subsequent treatment conducted while they are being guided back into service or civilian life. Our organization in Canada lends itself to the second method. By and large, this seems to be the better procedure for patients whose nerve injuries are treated in the late stages.

The chief weakness in our system of rehabilitation is lack of control of the patient's activities after he has received surgical treatment and has been discharged from the Special Treatment Centre hospital. The chain of events that ensues is straightforward enough for each patient, but no two men seem to follow the same path. Their vicissitudes include disembarkation leave, transfer to auxiliary Army hospitals or to re-training centres, the process of demobilization, out-patient status either in the Services or as a civilian, vocational training, attendance at university and new jobs. For such a diversified group there can obviously be no detailed standard regimen of treatment.

Facilities for arranging periodic return visits are excellent, but in practice we have found that it is very difficult to maintain regular contact with this heterogeneous group. Occasional re-examinations are essential in order to obtain records that will be of any value in the future. It does not seem necessary, however, to have frequent return visits at specific intervals with the group whose nerve injuries are treated in the late stages. This procedure entails one serious responsibility. It is essential that a plan or rehabilitation should be mapped out, and understood by the patient, before he leaves the active treatment centre.

Most of the wounded Canadians whom we have encountered, including the nerve injury cases, have an intelligence that is above the average. They were chosen for battle by a process of selection which included an assessment of mentality. It follows that they are a group who respond well to instruction. We have recently composed a short pamphlet about rehabilitation after nerve injury which is given to each patient on his admission to our service. They are advised to study the pamphlet and ask questions in order to clear up any aspect which they do not understand and to obtain more specific details about their particular disability. The pamphlet contains the rudiments of physiology concerning the action of peripheral nerves and advice about how the patient can learn some of the essential anatomical features of his limb. The importance of dogged persistence with physical re-education is stressed. Pessimism about an irreparable lesion is anticipated, and refuted by emphasizing the aim of recovery of function in the limb as a whole. An attempt is made to give the patient an important share of responsibility for the end-result.

SUMMARY

A few of the special problems concerning the management of nerve injuries in the late stages have been discussed. In no specialized branch of surgery is it more important to assess the situation as a whole. Observations should include an appraisal of the patient's personality and of his mental reactions to the disability. The aim of rehabilitation is restoration of maximal function to the limb, irrespective of the prospects from repair of any individual nerve. Secondary suture is only part of the surgeon's responsibility.

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Medical Dental Bldg.,
Vancouver.

RÉSUMÉ

Les cas tardifs dont il s'agit ici sont des sections nerveuses qui datent pour la plupart de plus de 6 mois. Les sujets sont des soldats de l'armée canadienne. La suture a été différée pour des raisons diverses; le plus souvent, à cause de la lenteur de cicatrisation de la blessure primitive ou de complications ostéo-articulaires. Il arrive parfois qu'une nouvelle exploration et une reprise de la suture soient indiquées. Dans tous les cas il importe d'apprécier correctement l'état mental du sujet qui, ou bien espère trop de l'opération, ou bien a intérêt à verses dans la névrose qui assurera l'indemnisation prolongée. On devra viser davantage à restaurer la fonction du membre tout entier que celle d'un nerf donné. Le sciatique, le radial, le cubital et le médian ont un comportement post-opératoire qui leur est propre; il semble que le radial suturé offre le meilleur pronostic. On aura recours à l'occasion aux transplantations adjuvantes de tendons. En somme, si l'on envisage le but ultime de la réhabilitation il faut songer davantage aux résultats terminaux obtenus dans le membre que dans le succès immédiat de la suture nerveuse et savoir que parfois l'absence de suture est préférable à une suture dont les résultats fonctionnels sont mauvais.

JEAN SAUCIER

Writing is like an iceberg: the part that shows above the surface is the portion that is published, but ten times as much lies below the surface.—From *The Canadian Author and Bookman*, June, 1945.

MALIGNANT THYMOMA*

By Francis N. Wilson, B.A., M.D. and J. E. Pritchard, M.D.

Montreal

IN his inaugural dissertation to the University of Heidelberg in 1900, Grandhomme[1] applied the term thymoma to all malignant tumours of the thymus regardless of their histological structure. It soon became apparent that Grandhomme had proposed in effect to group together a number of different conditions of neoplasia, using the simple criterion of their topography to indicate relationship. This position was untenable for a number of reporters, among whom was Symmers[2] who objected to the use of the term thymoma, since it conveyed no impression of a particular morphological picture, while on the contrary a number of authors reserved it for carcinoma and others insisted it be used to designate sarcoma. Symmers implied that it could logically be applied only when the precise structural elements of the thymus were reproduced by the tumour. Decker[3] pointed out that this attitude was, to say the least, inconvenient, since in no reported instance has a complete structural reproduction occurred, and suggested that the term be retained in its introductory sense or be dropped entirely and replaced with Ewing's classification.[4]

Ewing's classification is unacceptable because of his belief that all malignant thymomas are derived from the epithelial cells of the thymus. The belief that all intrinsic cells of the thymus are derived from the epithelial reticular cells of the organ is in direct opposition to the opinion of the vast majority of pathologists and histologists who accept the presence of both epithelial and lymphoid cell systems. The opposing school of thought has largely maintained its position on Ewing's negation and refuses to accept the independence of a lymphoid series until someone proves the small round cells, about which the debate persists, to be dissimilar from the epithelial cells. All efforts in this direction have but added evidence to the case for an independent lymphoid series. These efforts are perhaps best summarized by Cowdry:[5]

> "Small cells of the thymus not only look like lymphocytes but are lymphocytes. The most detailed comparison of nucleus and cytoplasm with contained mitochondria fails to afford a single morphological distinction between 'thymocytes' and ordinary small lymphocytes of lymph nodes and blood stream. Both behave in the same way. They exhibit the same type of amœboid movement and are capable of tranformation into plasma cells. They are equally susceptible to roentgen radiation, and are agglutinated and cytolyzed by the same specific serum."

Aside from further arguments set forth by Dantchakoff,[6] Pappenheimer,[7] Hammer,[8] and Maximov,[9] the evidence submitted by the pathologists who sought the characteristics of a combined lymphoid and epithelial organ in conditions of disease has been overwhelmingly in line with this viewpoint. True lymphoid follicles have been demonstrated in the thymus in hyperthyroidism by Barton and Branch[10] and in cases of myasthenia gravis, Addison's disease and acromegaly by Sloan.[11] Indeed, the wide variation in the size of the gland, reflected in conditions of involution both of age and accidental nature as well as hyperplasia, is mainly concerned with alterations in lymphoid content.[8]

For these and numerous other reasons the existence of an independent lymphoid system has seemed to us an unavoidable conclusion.

The lymphoid system in the thymus becomes established by migration of lymphocytes into the primitive epithelium of the organ early in the fetal life. The lymphocytes ultimately form dense round-cell masses in the cortex and most importantly diffusely infiltrate the medulla. It is pertinent to note here that the lymphocytes become established by migration into the organ. This process of establishment is rather unique in the sense that there is no hint of origin *in situ* from a pre-existing reticulo-endothelial system. Although tissue histiocytes exist there is no evidence to support their participation in lymphoid histogenesis.

In the medulla the epithelial elements appear in a ramified reticular form. Secondarily, the central epithelial cells hypertrophy and form the well-known Hassall's corpuscles. These epithelial reticular cells vary in their morphology and, in certain variants, can be seen to approach closely the appearance of lymphocytes which have an eccentricity in their own right. There is thereby created a zone of cell variation where the lymphocytes simulate reticular cells and conversely epithelial cells simulate lymphocytes. The schematic representation of these two cell systems seen in Fig. 1, illustrates the genuine closeness of this relationship in morphology.

* From the Department of Pathology, the Montreal General Hospital.

At this point the possibility of the confusion of two types of tumour arising through the existence of two closely similar although different small cells becomes worthy of consideration. Our series of cases which for a long time defeated diagnosis on a histological basis became clear when viewed with this in mind. The lymphosarcoma group are limited by the variations reached by the small and large lymphocyte. On the other hand, the epithelial reticular cell tumours extend from small polygonal cells of dimensions approaching that of a lymphocyte on the one extreme, to enormous multilobed or multinucleated giant cells on the other. Between these lie large cells whose epithelial identity is accepted. With this scheme in mind the conflicts, and the almost unalterable confusion in the literature, are easily understood.

An attempt was made by Crosby,[12] in 1932, to bring together the cases appearing in the literature since Rubaschow's[13] collection of 69 cases in 1900, by shunting cases diagnosed as lymphosarcoma, lymphadenoma, thymoma, sarcomatous thymoma, lymphocytoma, etc., into the sarcoma group and cases labelled under some variation of thymic carcinoma into the carcinoma group. As a consequence, epithelial reticular cell tumours as well as lymphosarcomas are represented in both groups and contribute to both groups a set of clinical and pathological characteristics that are supposed to be distinctive for each group. Subsequent reports have accepted these statistical summaries and have incorporated them with concepts of the specific nature of thymic sarcoma on the one hand and carcinoma on the other.

A histogenic analysis of the cases classified as sarcoma reveals cellular tumours which range from small round cells belonging properly to the lymphosarcomas to multilobed and multinucleated giant cells of the epithelial series. The results of pursuing such a course are obvious.

To this point in our paper, we have, in a general way, endeavoured to clarify the problem of the malignant thymomata by indicating their histogenic nature. A discussion of the position of the two cell types in thymic oncology and an analysis of these specific cell types in representative cases follows.

MATERIALS AND METHODS

There were available in the files of the Department of Pathology of The Montreal General Hospital, eleven necropsied cases of malignant thymoma in a total of 7,500 autopsies over a period of 25 years; an incidence of 0.014%. Symmers[2] reported an identical incidence. For study, our cases were subjected to routine hæmatoxylin-eosin stains and as many as possible to Masson's trichrome, Giemsa's polychrome, Laidlaw's reticulum stain and phosphotungstic acid hæmatoxylin.

Fig. 1.—This diagram demonstrates the close morphological relation between the cells of the lymphoid series and cells of the reticular series. Note the tendency toward larger size, cytoplasmic and nuclear pleomorphism, and irregular chromatin dispersion in the reticular series. **Fig. 2.** (Case 4).—Malignant thymoma of lymphoblastic sarcoma variety. (A) Illustrates the tumour *in situ*. (B) Is a cross section taken at the commencement of the superior vena cava. (C) Is a cross section drawn at the level of the auricular introitus.

1. Tumour.
2. Right lung.
3. Left lung.
4. Heart.
5. Pericardium.
6. Aorta.
7. Pulmonary artery.
8. Superior vena cava.
9. Right auricle.
10. Left auricle.
11. Right bronchus.
12. Œsophagus.
13. Thymus.

Our eleven cases were selected on the basis of the following criteria: (1) anatomical position; (2) method and degree of extension; (3) gross characteristics; and (4) histological analysis.

Regarding the anatomical position it is obvious that the main tumour mass occupies and extends from the locale of the thymus in the anterior and superior mediastinum. The cervical extensions of the normal thymus merit special attention, for these may easily explain the proclivity of many thymic tumours to extend into the neck. Moreover, they form a close, if not direct connection, between the cervical and mediastinal lymphatic systems. The lymph channels drain into the superficial and deep cervical lymph nodes and anterior mediastinal glands. The efferents from the latter unite with tracheo-bronchial glands and account for the similarity to the course of bronchogenic carcinoma that many of these thymic tumours pursue.

Ordinarily, in the case of thymic neoplasms, one may expect to find continuity of extension into the neck, middle mediastinum, inferior mediastinum, or laterally into the lungs.

In the selection of our cases we have been especially hesitant about accepting tumours which involve the mucosal surface of the bronchi, and present themselves with their main tissue mass in the middle and posterior mediastinum. The danger here, especially acute when one is dealing with an anaplastic and highly undifferentiated carcinoma, is the possibility of confusion with bronchogenic tumours. The spread of these to the tracheomediastinal nodes and the subsequent lymphatic permeation much in the same course as that of thymomata has already been emphasized. Pathologically, the absence of bronchial involvement and pulmonary suppuration in tumours of the thymus has been reflected clinically in the infrequency of a productive cough.

Concerning the gross characteristics a great deal of variation in consistency and colour is seen, depending upon the integrity of vascular supply and the degree of attendant fibrosis. For the most part the tumours are creamy white in colour, firm in consistency, and smooth in texture. This does not aid much in identification but the lobulation of the exterior is more unique (Fig. 2). Necrotic areas are usually present but these generally do not attain the dimensions of massive softening.

For an orderly appreciation of the histological characteristics of these tumours some sort of systematization is necessary. The term thymoma we believe should be applied to conditions of neoplasia arising from either the lymphoid or epithelial system of the thymus. We therefore propose to discuss the groups of thymic neoplasms which have their histogenesis in either component. For convenience these can be classified as follows:

MALIGNANT THYMOMA

A. Thymic carcinoma.
   1. Diffuse reticular.
      (*a*) Small cell.
      (*b*) Large cell.
      (*c*) Giant cell.
   2. Simple.
      (*a*) Medullary.
      (*b*) Alveolar.
      (*c*) Adeno.
      (*d*) Epidermoid.
B. Thymic sarcoma.
   1. Lymphocytic.
   2. Lymphoblastic.
C. Associated with systemic entities.
   1. Leukæmia.
   2. Hodgkin's.

As a matter of convenience for demonstrating the relations between cells of these different tumours the sarcomata are presented first.

THYMIC SARCOMA

This major group is readily divisible into lymphocytic sarcoma and lymphoblastic sarcoma. Other tumours may arise from mesenchymal elements but the importance of these derivatives is negligible from the standpoint of specific thymic structure or function. Hence they are not considered as thymomata from other than a topographical grouping.

The relation between lymphocytic and lymphoblastic sarcoma is well-known and needs no further elucidation.

LYMPHOCYTIC THYMOMA

These tumours consist of small round cells with compact nuclei and defy differentiation from lymphocytic sarcoma elsewhere. Their uniformity would seem to exclude the possibility of confusion with thymic carcinoma but such an exclusion is more apparent than real. Case 5, of the following reported cases, a predominantly small cell reticular carcinoma, demonstrates this fact well. Scattered among cells which are to all apparent purposes lymphocytes are cells of giant dimensions, whose derivation is obviously not lymphoid, which are in every way identical with the cells seen in pure and

unmistakably reticular tumours, and whose relation to the small cells can be traced through transitional forms. For the purposes of comparison the following three cases of lymphocytic sarcoma should be kept in mind.

CASE 1

Clinical examination.—Male, C.B., aged 23, was well until February, 1937, when he began to feel continually tired. In March he developed a dry, unproductive, hacking cough. In April he was admitted to a New York hospital when a diagnosis of thymoma was made. After ten days' treatment with x-ray he felt greatly improved and was discharged.

In May, 1937, his symptoms returned and he was admitted to this hospital with the additional complaints of dull crampy pains in the left chest and a sense of obstruction in his throat.

Physical examination revealed a space occupying lesion of the left chest with loss of distinction of the cardiac area. Temperature 98°, pulse 92, blood pressure 120/80, respirations 22.

Laboratory examinations.—*Roentgen*: Shadow extending above the aortic arch to the left side and small amount of fluid in the left base. *Pathological*: Pleural fluid: heavy deposit of lymphocytes, without mitotic figures, but whose clumping suggests malignancy. *Hæmatological*: Red blood cells 4,400,100; white blood cells 7,400; polymorphonuclears 70%; lymphocytes 20%; monocytes 10%; Hgb. 10.5 gm. *Metabolic*: Basal metabolic rate, plus 15.

Clinical course.—Aspiration of the left chest was commenced immediately and x-ray therapy was instituted on June 3, 1937. He was given 1,700 to 2,000 R.U. to June 25, and symptomatic improvement followed. July 28 marked the beginning of abdominal and testicular symptomatology as well as an increase in the severity of his respiratory distress. Despite another course of x-ray therapy he became weaker and died on October 24, 1937, with signs of generalized sarcomatosis.

PATHOLOGICAL SUMMARY

Gross findings.—On opening into the thoracic cavity, a tumour was found lying in front of the heart. It was irregular and pear-shaped, measured roughly 3 cm. in length, and consisted of two lateral lobes and a central isthmus. From the central isthmus there extended anteriorly a tumour mass which was whitish, rubbery, and mobile.

The pleural layers of both cavities were grossly invaded by marble white tumour. The only invasion of the lung was in the form of a 1.5 cm. round firm nodule in the hilus of the left lung. The right lung was collapsed.

The tumour had grown down the posterior mediastinum, chiefly on the left side, and enclosed the descending aorta and œsophagus, developing a traction diverticulum of the latter. After involving the superior aspect of the diaphragm it descended between the crura posteriorly into the retroperitoneal space where it extended in a series of continuous nodules to the level of the 3rd lumbar vertebra. At the region of the spleen and kidney it came forward on the left side while on the right it was in close association with the kidney pelvis.

Microscopical findings (Fig. 3).—Sections of the tumour and metastatic sites show a cellular mass composed of remarkably uniform small round, oval, and polygonal shaped cells supported by a delicate vascular connective tissue stroma which merges into denser strands dividing the tumour into small lobules and sheets. These discrete and uniform cells are of the dimensions of adult lymphocytes with dark nuclei and scanty cytoplasm. There is a notable lack of pleomorphism and absence of cells of epithelial or giant dimensions.

Diagnosis.—Malignant thymoma of the lymphocytic sarcoma variety. Extension to left pleura, hilus of left lung, retroperitoneal space, pancreas and periadrenal tissue. Metastasis to mediastinal, upper abdominal, right and left axillary nodes, kidneys, right tunica vaginalis, and testis and cord.

CASE 2

Case submitted for autopsy from outlying hospital. No clinical history available.

PATHOLOGICAL SUMMARY

Gross findings.—Upon opening the thorax, the mediastinum was seen to be invaded by a large solid mass bounded on both sides by the lungs. Posterior to the mass lay the œsophagus, trachea, and descending aorta all of which were somewhat compressed by the tumour.

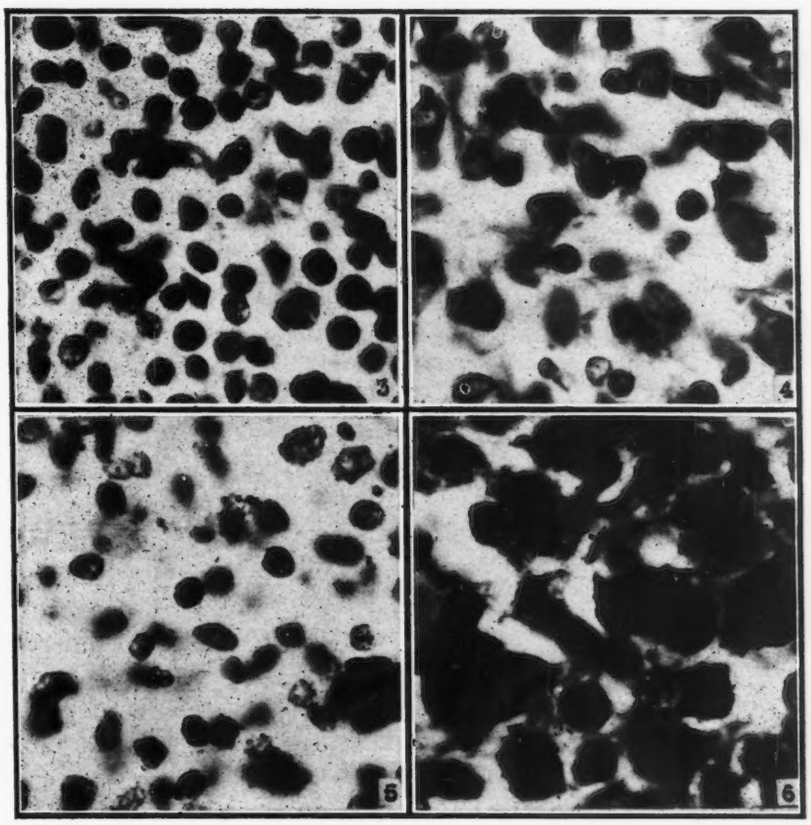

Fig. 3. (Case 1).—Lymphocytic sarcoma. Note the regularity in cell and nuclear size and relatively even dispersion of nuclear chromatin. **Fig. 4.** (Case 4).—Lymphoblastic sarcoma. Note the transitions between cells of the larger and smaller orders but absolute absence of giant cells. The smaller cells are identical with adult lymphocytes, the larger with immature lymphoblasts. **Fig. 5.** (Case 5).—Diffuse reticular cell thymoma of the small cell variety. Note the predominance of small cells with variation extending to the giant multilobed cells. **Fig. 6.** (Case 6).—Malignant thymoma of the large cell reticular variety. Note the relatively large, irregular, pleomorphic cells with the transition to large multilobed giant cells.

The two main bronchi passed through it. They were not invaded grossly but were somewhat narrowed by compression. On the superior aspect, the arch of the aorta and ascending branches also passed through the tumour mass without being invaded. On the right border lay the superior vena cava which was almost completely flattened but not invaded. The left innominate vein met the right at the superior lateral aspect and was plugged with a thrombotic mass. The whole of the anterior mediastinum was a solid mass of tumour which had grown down over the pericardium where at its base it measured 3 cm. in thickness. Over the left ventricle the pericardium had been invaded and the heart itself covered by a rough nodular jacket of tumour. Where the lungs were adherent to the tumour mass the pleura and lung for a distance of 4 cm. were invaded at the hilus.

Microscopical findings.—The tumour mass is composed of closely packed small round cells with compact densely staining nuclei and scanty cytoplasm. There is no other cell type in evidence. Mitotic figures are infrequent. A section through the lung hilus consists of large cartilaginous bronchus surrounded by tumour which extends into the bronchus between cartilages, about the mucous glands in the submucosa but does not involve the mucosa itself except at one small area, where it extends right up to the thickened basement membrane. About the bronchus tumour can be seen in some of the veins, both in the lumens and infiltrating the walls. Sections of the involved lymph nodes show almost complete replacement with tumour which is seen to be travelling in the afferent channels. Sections of adrenals show invasion only at their margin from the peri-adrenal fat.

Diagnosis.—Malignant thymoma of the lymphocytic sarcomatous variety. Extension to pericardium, heart, bronchi, and veins of lungs. Metastases to para-aortic abdominal nodes, and peri-adrenal and adrenal tissues.

CASE 3

Clinical examination.—Male, A.S., aged 18, was well until March 21, 1925, when two weeks previous to admission, he noticed difficulty in breathing and excessive fatigue. A non-productive cough and difficulty in swallowing developed in the following week.

Physical examination revealed a space-occupying lesion of the right chest extending upward into the neck anteriorly. Compression of superior vena cava by a mediastinal neoplasm with congestion of facial veins was evident. Temperature 98.6°, pulse 102, blood pressure 120/90 and respirations 28.

Laboratory examination.—Roentgen: Anterior mediastinal growth with right-sided pleural effusion and displacement of the heart to the left. *Pathological*: Small lymphocytes and eosinophiles in aspirated fluid from pleura. *Hæmatological*: Red blood cells 5,350,000; white blood cells 18,200; polymorphonuclears 62%; lymphocytes 20%; eosinophiles 16%; monocytes 2%.

Clinical course.—Frequent chest aspirations were carried out but patient declined rapidly and died on June 17, 1925, after progressive dyspnœa, cyanosis, and chest pain.

PATHOLOGICAL SUMMARY

Gross findings.—The intrathoracic tumour consisted of a large mass situated above and to the right of the pericardium from which it could not be separated, and was continuous with the anterior cervical lymph nodes. The outer margin pressed upon and constricted the superior vena cava and was adherent to the medial surface of the right lung. Greyish white nodules extended over the parietal and visceral pleura of this lung, which was collapsed and surrounded by 3.5 litres of fluid. From the hilus the tumour could be followed toward the base of the heart where the right pulmonary artery was compressed by the tumour but the pulmonary veins not involved.

While the left lung demonstrated no gross lesion, the right was invaded at the hilus by a neoplasm which extended out into the parenchyma as tongue-like processes becoming nodular terminally.

Microscopic findings.—The main tumour and its metastatic sites is composed of a diffuse and uniform cell mass. These cells are discrete, small, generally round and contain scanty eosinophilic cytoplasm. The nuclei are quite round and compact with no uneven dispersion of chromatin. Hyperchromatic pleomorphic cells are notably absent.

Diagnosis.—Malignant thymoma of the lymphocytic sarcoma variety with invasion of the right lung, pleura, lymph nodes of the cervical chain, and superior surface of the right dome of the diaphragm.

LYMPHOBLASTIC SARCOMA

The larger cell size, as well as the greater pleomorphism which characterizes these tumours, increases the likelihood of their confusion with the reticular cell group. They fall into the cell size range occupied by the more frequent large cell reticular thymomata. Fortunately several characteristics are sufficiently dissimilar to make differentiation possible.

1. The variation in the cell size which the large cell reticular carcinoma produces tends toward the giant order while the variations in cell size which the lymphoblastic sarcoma demonstrates tends toward the lymphocytic side.

2. In the reticular cell tumours the cytoplasm tends toward greater basophilia, irregularity in contour, and intensity.

3. The variation seen in the nuclear shape of the lymphoblastic group is typified by oval, elongated, and indented forms. The nuclear variation of the reticular cell thymoma is apparently without limitation and assumes the most bizarre shapes and forms.

4. The chromatin content of the nucleus in the lymphoblastic sarcoma is generally evenly dispersed while in the larger reticular cells it is unevenly distributed with large irregular deposits standing out in a pale nucleoplasm.

5. Mitotic figures and anaplasia are generally more evident in the reticular group.

For purposes of comparison the following case of lymphoblastic sarcoma should be studied in relation to cases six and seven of the reticular cell group.

CASE 4

Clinical examination.—Female, F.C., aged 19, was in excellent health until January, 1944, when she developed pain in the left shoulder. At the same time she noted the onset of an unproductive cough. In June she developed pain in the left upper chest. One month previous to admission she suffered from a severe attack of laryngitis and at the time of admission was hoarse. For the week preceding admission the cough was productive of a slight amount of whitish sputum. During the last two months there had been a weight loss of fifteen pounds associated with a loss of energy. No other complaints referable to any system could be elicited on inquiry.

Physical examination revealed evidence of a space occupying lesion of left chest and substernal area with tracheal displacement to the right. Blood pressure 105/74, pulse 90, and respirations 20 per minute.

Laboratory examination.—Roentgen: General appearance of anterior mediastinal tumour rather than a lesion of the lung itself. *Hæmatological*: Red blood cells were reduced to 3,950,000; white blood cells 7,600. Lymphocytes constituted 43% of the cells. *Pathological*: Biopsy diagnosis of tissue from anterior mediastinal tumour at operation was malignant thymoma.

Clinical course.—A tentative diagnosis of anterior mediastinal tumour was made with secondary paralysis of the left phrenic and left recurrent laryngeal nerve. An exploratory mediastinotomy was undertaken by Dr. Fraser B. Gurd, on August 8, 1944, who felt that the tumour might be benign in character. It became apparent upon opening into the anterior mediastinum that removal of the tumour was impossible. It was Dr. Gurd's intention to press the employment of x-ray radiation should the patient survive the surgical interference, but death occurred on the day following operation.

PATHOLOGICAL SUMMARY

Gross findings (see Fig. 2).—On opening into the thoracic cavity the left lung was found collapsed and there was a pneumothorax of the left pleural cavity.

The mediastinal mass was bounded anteriorly by the sternum and anterior thoracic wall, posteriorly by the œsophagus, laterally by the pleura of the left lung, and medially by the right lung. Superiorly it was limited by the left innominate vein while inferiorly it extended to within 2 cm. of the lower heart margin. It measured 12 by 10 by 8 cm. The presenting surface was convex and nodular and its lower margin extended downward in irregular finger-like projections. In colour it was light pink while the consistency was firm.

The main mass lay to the left and extended into the upper lobe of the left lung which had been pulled medially by constricting outgrowths of tumour. The superior vena cava ran beneath the right superolateral margin of the tumour which compressed the vessel. Posteriorly and superiorly it surrounded both the aorta and pulmonary artery, constricting them, and continued around the left main branch of the latter to lie in close approximation to the œsophagus. It had insinuated itself behind the left innominate and great arteries to the head and neck to lie against the trachea above. It was in this region that the left recurrent laryngeal and left vagus nerve were buried in the tumour. In front it rested against the parietal pericardium, following it to the lower margin of the heart and attached itself to the surface of the heart there.

The right lung showed no evidence of tumour. In the left lung, the lower lobe was free of tumour but the upper lobe was extensively invaded by outgrowths becoming confluent and solid in the parenchyma. It extended to the inter-lobar septum and to the pleural margin laterally, but did not project from the mucosal surface of any of the bronchi although involvement of their walls and compression of the lumina were obvious.

The other organs with the exception of the adrenals showed no gross lesion. Both adrenal cortices were thickened and the medullary areas replaced by firm, light yellow tissue.

Microscopical findings (see Fig. 4).—The main tumour mass and its metastatic sites demontrate a diffuse cell picture composed of cells varying from the dimensional order of small lymphocytes to cells two and a half times as large (6 to 15 μ). These are intimately related to an evenly distributed and heavy reticulum consisting of fine and coarse fibrils. A collagenous stroma in the form of coarse trabeculæ divides the tumour into irregular lobules while a few delicate collagenous fibres intertwine between lobules.

The majority of the cells are of the large order and when compared with the smaller are seen to contain more abundant and irregular eosinophilic cytoplasm, larger and more pleomorphic nuclei. These are preponderantly oval in form, have a granular dispersed chromatin, eosinophilic nucleoli, and moderate numbers of mitotic figures. The small cells on the other hand are definitely rounded with scanty cytoplasm. The nuclei are generally round and compact with little or no dispersion of chromatin, no visible nucleoli, and no apparent mitotic figures.

Diagnosis. — Malignant thymoma of the lymphoblastic sarcoma variety. Extension into the neck, hilus of the left lung, pericardium, myocardium, superior vena cava, left vagus and recurrent laryngeal nerves, cardiac nerves, left bronchus, and peribronchial nodes. Metastases to both adrenals and ovaries.

CARCINOMA

Regarding this major category we have only a few additional points to discuss. It should be borne in mind that the reticular cell tumour is the most difficult of all malignant thymic neoplasms to define. It presents a most varied picture. Predominantly small cell, large cell and giant cell tumours can be distinguished but in all the cases collected more than one cell type has been found. In considering all these epithelial cell tumours one should especially be aware of the lymphocytes which frequently infiltrate the tissue rather heavily and obscure the picture. Or conversely, the tumour may heavily infiltrate preformed lymphoid tissue. This is but to be expected in an organ which is composed of both elements. The presence of lymphoid tissue and the inability to differentiate malignancy from infiltration has led authors to call these tumours lymphoepithelioma, lymphocarcinoma, etc. Ewing,[4] Matras and Priesel[23] and others have drawn attention to the passive nature of the lymphocytes.

The medullary and alveolar subdivisions of the carcinoma group differ markedly from the diffuse reticular tumours, although their relationship has been demonstrated by MacDonald,[14] in his series of apparently transitional cases. These tumours consist of solid sheets, cords or alveolar groupings of epithelial cells and are easily differentiated from the sarcomata. Because of their dissimilarity from diffuse reticular cell tumours, their occurrence in a distinct age group, and the finding of almost pure adenocarcinoma among them, the possibility of an origin from a persistent thymic duct should be worthy of consideration.

However, all that can be demonstrated at the moment is that the thymic epithelial cell has the potentialities for development in at least three directions. One is toward the reticular cell, another toward Hassall's corpuscles, and a third reverts to the more familiar primitive cell which

may in turn differentiate into medullary, alveolar, adeno, and even epidermoid forms of carcinoma. The representation of variations of these combinations present in the literature is an extremely interesting feature of thymomata.

Diffuse reticular cell thymoma. — The main characteristics of diffuse reticular cell thymoma have already been outlined in summarizing the details of dissimilarity from the sarcomata and need no more elucidation here. Of the cases that follow, Case 8, is particularly interesting from the standpoint of demonstrating the relationship which exists between the diffuse reticular cell tumour and the more common varieties of ordinary carcinoma. The primary site reflects the pleomorphic, mixed reticular cell picture and two metastatic sites show different conformations again. One is almost purely medullary carcinoma, the other adenocarcinoma.

CASE 5

Clinical examination.—Male, W.M., aged 56, was admitted January 3, 1932, with complaints of pain in the epigastrium and dyspnœa. His history dates back to July, 1931, when he noted swelling of the ankles. Four months later his voice became soft and weak. In the latter part of December, he suffered from an attack simulating angina. Three days before admission his precordial pain became severe and persistent.

Physical examination revealed râles at the bases of both lungs and tenderness over the abdomen. No signs of his primary condition were present.

Laboratory examination.—Without significance.

Clinical course.—Decline was rapid and he died on January 6, 1932, three days following admission.

PATHOLOGICAL SUMMARY

Gross findings.—Upon opening the peritoneal cavity a suppurative peritonitis and perforated duodenal ulcer was found.

In the thoracic cavity a large mediastinal tumour was found which extended anteriorly to the sternum, superiorly to the clavicles, inferiorly to the lower margin of the left auricle, and laterally to the hila of both lungs. Encircling the ascending aorta, it could be followed under the arch where, posteriorly, it surrounded the trachea and main branches of the bronchi. The superior vena cava lay at the right margin of the tumour. The vessels, bronchi, and trachea were not invaded by the tumour. Although the hilar lymph nodes of both lungs were involved, no massive invasion of either lung had taken place. There was extension along the interlobar pleura of the left, however. The tumour was greyish-white, lobulated and firm throughout.

Microscopical findings (Fig. 5).—This tumour resembles lymphosarcoma closely and consists of a compact cellular mass intersected by coarse connective tissue trabeculæ. The cells, for the most part, are of the dimensional order of lymphocytes, but on the average a little larger. The cytoplasm is generally very pale, but well defined, and has rounded or polygonal contours.

The nuclei vary considerably from rounded to oval and elongated forms. Although containing considerable chromatin this is unevenly dispersed. Scattered throughout are cells of twice the dimensions and further transitions are seen in size until cells of forty micra are seen which are multinucleated and multilobed. Some of these giant cells are mononuclear and contain large oval nuclei. All of these larger cells are extremely hyperchromatic and mitotic figures are fairly numerous.

Diagnosis.—Malignant thymoma of the diffuse small-cell reticular variety with invasion of the lungs.

CASE 6

Clinical examination.—Male, B.P., aged 32, was admitted June 29, 1944, complaining of pain in the back, legs, left shoulder and left arm. Both his right and left hands felt weak and his fingers numb. This history began in April with undue fatigue and loss of appetite. In the last six months he lost twenty pounds in weight and considerable strength. At the time of admission he was unable to even sit up.

Physical examination revealed apparent normality of the chest and abdomen. A tumour was seen filling the left temporal fossa. Palpable glands were present in each axilla. Weakness was noticed of both the left and right hands with thinning of the left hypothenar and thenar eminences. The patellar reflex could not be obtained and the abdominal reflexes were decreased.

Laboratory examination. — *Roentgen*: Marked soft tissue swelling on the left side of the head. In the chest there was an increase of the left hilar shadow with shadows extending out into the left lung field. The retropharyngeal space at the level of the fifth and sixth cervical vertebræ was widened. *Pathological*: Lymphosarcoma of the right axillary node. *Hæmatological*: Normal.

Clinical course. — In July fullness of the supraclavicular fossa was noticed and in August parasternal swelling and pain. The liver edge became palpable and on November 12, 1944, the patient died following the development of marked dyspnœa and anasarca.

PATHOLOGICAL SUMMARY

Gross findings.—On opening the body a large mass of tumour was seen lying immediately beneath the skin of the right thorax. This extended up from the substernal area through the suprasternal notch, had almost disarticulated the sternoclavicular joint on the right side, was attached to the pectoralis major on its deeper aspect, and involved the left subcutaneous tissues to the distance of 3.5 cm. on that side. It rose some 2 cm. above the clavicle and likewise infiltrated inferiorly reaching the ninth ribline where it blended imperceptibly with the muscular tissues on the right side. There was, then, a tumour occupying the right pectoral area, extending to the left of the mid-sternal line for a short distance, and continuous with a mass lying in the anterosuperior mediastinum.

In the thoracic cavity the tumour mass was attached to the parietal pericardium and was bound on both sides by the auricular appendages, and above by the origin of the great vessels to the head and neck. It measured roughly 4 by 6 cm. and was stony hard in consistency and white in colour. The cut surface had a lobulated appearance with small hæmorrhagic areas interspersed between lobules. Small nodules measuring about 0.3 cm. in diameter extended apparently without continuity down the lateral surface of the parietal pericardium, and on to the pleural surface of the right lung. The pericardium was distended with fluid as were the pleural cavities.

The surface of the right lung was peppered with tumour nodules. The larger portion of the base of the middle lobe was occupied by tumour which extended into, and occluded the middle lobe bronchus. The lower lobe bronchus was free although the tumour extended up to its margin at its origin. The upper two-thirds of the lower lobe of the left lung was occupied by tumour. This again was in intimate relation to the bronchus of that lobe and extended to the mucosa. There was no peribronchial adenopathy affecting nodes lying in close relationship to the tumour.

The abdominal cavity contained 3,000 c.c. of fluid. No larger masses of tumour were palpable in the cavity. However, small nodules could be palpated in the mesentery and in the greater omentum. Prevertebral tissue

was infiltrated with tumour for a depth of 1.0 cm. in the region of the fifth lumbar vertebra. This faded out so that none could be detected in the twelfth thoracic area. Likewise the precervical fascia was infiltrated as high as the thyroid cartilage and the brachial plexus was involved by the mass. This again, was continuous with the substernal tumour.

The rest of the gross examination was devoid of pertinent findings except for the left kidney whose subcapsular surface showed a small nodular metastasis.

Microscopical findings (Fig. 6).—The main tumour and its metastatic sites consist of a uniform cellular structure lying in intimate relation to a reticular network consisting of coarse and delicate fibrils. A collagenous stroma divides the tumour into lobules and in the lobules a finer stroma runs between cells.

The cells range in dimensions from 16 to 40 micra. The majority are of the smaller order with irregular polygonal outlines. Cytoplasm is abundant, opaque, and tends toward basophilia. Nuclei are bizarre and hyperchromatic. The multiplicity of nuclear shape is impossible to describe. The nuclear chromatin is gathered into unevenly dispersed deposits resulting in a vesicular appearance. Many contain large eosinophilic nucleoli.

Cells of the larger order are multinucleated and multilobed as well as mononucleated. Some of the multinucleated cells contain as many as eight nuclei while the multilobed cells show irregular foldings of the nucleus. These large cells are generally more hyperchromatic than the smaller cell and mitotic figures are numerous among them.

Diagnosis.—Malignant thymoma of the large cell reticular variety with massive extension into the supraclavicular area; metastases to the hilar region of the right lung, left lung and multiple metastases to the pericardium and pleura of the right lung, prevertebral and precervical tissues, and left kidney.

CASE 7

Clinical examination.—Male, P.H., aged 37, was admitted on January 5, 1922, complaining of swelling of his chest, cough, pain in the right chest and loss of fifteen pounds of weight.

The swelling had been noted eighteen months previous to admission. Inquiry revealed that he had had a cough with expectoration in the morning for several years and night sweats for about five months.

Physical examination revealed a very large, irregular tumour occupying the front of the chest and enlarged left anterior cervical and axillary glands. These were firm and discrete.

Examination of the chest was negative except for the area occupied by the tumour. Although there was no apparent displacement of the heart, the right border was marked 7 cm. beyond the sternal margin and a diffuse pulsation of the tumour appeared to be transmitted from the heart. Heart sounds at the apex and base were distant but otherwise normal.

Laboratory examination. — Roentgen: Showed a large, dense, homogeneous soft-tissue shadow anterior to the bony thorax, definite enlargement of the right hilar shadow, and increase of the heart shadow to the right. *Pathological*: Pleural fluid showed a predominance of large and small lymphocytes and malignant cells with mitotic figures. Undifferentiated type. *Serological*: Blood Wassermann, four plus. *Hæmatological*: No reduction in red blood cells. White blood count 8,500, of which 7% were eosinophiles. Otherwise normal hæmogram.

Clinical course.—In February, the patient began to run intermittent fever with peaks of 102.4° which persisted until his death. The essential symptomatology remained unchanged except for the appearance of an enlarged liver on June 12 dullness over the flanks, and a pericardial friction rub. The superficial tumour resolved partially after several courses of x-ray therapy but increased in its intrathoracic part. In June signs of rapid decline commenced with increasing cough and expectoration, loss of weight and profuse sweating. He expired on July 3, 1922.

PATHOLOGICAL SUMMARY

Gross findings.—Occupying the central portion of the subcutaneous tissue of the thorax and commencing one inch below the upper border of the manubrium and extending downward to the xiphoid cartilage and laterally to the nipple line on either side was a large nodular mass measuring approximately 17 by 15 by 5 cm. The surface of this mass was irregular and the skin over it was fixed to the underlying tissues. On cutting through the skin the tumour was seen to be nodular and extended through the sternum to become continuous with a retrosternal mass.

The greater part of the anterior mediastinum was replaced by tumour which invaded the pericardium, pleuræ, right lung, diaphragm, and mediastinal glands. The tumour was pale and greyish white in colour, homogeneous in nature and fairly firm in consistency.

The tumour had invaded the parietal and visceral layers of the pericardium on the supero-lateral aspect and had penetrated the epicardium on the right side. The right lung had been invaded by tumour predominantly in its middle and lower lobes. About the visceral pleuræ were scattered numerous nodular metastases. There was a caseous tuberculous nodule of the apex of the left lung.

In the peritoneal cavity the lower surface of the diaphragm, liver, appendix, and retroperitoneal mesenteric glands were invaded by this growth.

Microscopical findings.—The cells constituting the tumour are closely packed. In size they average approximately twenty micra. Their cytoplasmic constituent is moderate but the nuclei are relatively large. Many of the latter contain nuclei which are themselves the size of small lymphocytes. The nuclear membrane is well defined and the chromatin is irregularly and sparsely dispersed resulting in a vesicular appearance. The majority consequently are hypochromatic although a few reach the opposite extreme. Mitotic figures are infrequent. Some nuclei show irregular foldings and bizarre shapes. Also scattered throughout are larger cells of giant dimensions some of which have very large irregular solitary nuclei while others are multinucleated and contain two to seven nuclei. There are no eosinophils and only a few passive lymphocytes. The metastatic sites show similar cellular characteristics.

Sections of the lungs show only a small amount of recognizable parenchymal tissue. The remainder consists of a solid cellular tumour mass in which there are incorporated blood vessels. Of these the pulmonary veins can be seen to be diffusely invaded by tumour. The general pattern of the tumour follows the general architecture of the lung.

Diagnosis. — Malignant thymoma of the large and giant cell reticular variety with extension to the right pleura, right lung, pericardium, diaphragm. Perforation of the sternum and spread in the subcutaneous tissues of the thorax. Metastases to the liver, appendix, and bronchial, supraclavicular, infraclavicular, axillary, retroperitoneal, and mesenteric nodes.

CASE 8

Clinical examination.—Male, F.P., aged 37, was admitted on February 8, 1939, complaining of a swelling extending into the neck from the chest, of three months' duration. This caused extreme dyspnœa, eventually hoarseness and a productive cough. There was fifteen pounds of weight loss in this three month period.

Physical examination revealed a substernal mass, cyanosis, dyspnœa and dilated superficial veins of the thorax.

Laboratory examination. — Roentgen: A lobulated mass involving the region of the aortic arch in front of the trachea. *Hæmatological*: Of no significance.

Clinical course.—Decline was rapid, with the development of a severe respiratory infection, progressive dyspnœa and emaciation.

PATHOLOGICAL SUMMARY

Gross findings.—Upon opening the thorax the entire superior mediastinum was seen to be occupied by a tumour mass measuring 12 by 7 by 9 cm. It was attached anteriorly to the manubrium and posteriorly to the trachea. It extended from 3.0 cm. above the suprasternal notch down to the upper margin of the heart. Lobulation was the unique feature of its exterior surface and in conformation the tumour was roughly oval. The mass incorporated the superior vena cava, the first part of the aorta, and the great vessels to the head and neck. The veins were both compressed and infiltrated with tumour while the arteries were only slightly compressed. The consistency was firm and on cross section fibrous septæ were seen to intersect the mass. Some softened areas of necrosis were interspersed.

Multiple sections of the lung and bronchi revealed no evidence of tumour.

Of the abdominal viscera only the mesenteric nodes and the adrenals showed any evidence of tumour. The left adrenal was enlarged and its interior was replaced by tumour tissue similar to that seen in the mediastinal site. The medulla of the left contains a few 2 mm. nodules of similar neoplasm.

Microscopical findings (see Fig. 7).—The main tumour site consists of a very pleomorphic cell mass. The cells are for the most part large and polygonal in shape although extreme variations in both contour and dimensions are present. A feature of this histological variation is the presence of many tumour cells of giant dimensions most of which are mononuclear. Some however are multinucleated and assume extremely bizarre forms containing bulky nuclei. Throughout there is as great variation in nuclear staining reaction as there is in cell shape but the general tendency is toward hyperchromatism.

Nowhere does the tumour invade the wall of the bronchi. Although the wall of the trachea is invaded, the growth does not involve the mucosal surface.

Sections of the left adrenal show replacement of practically the entire gland by tumour growth. Here the tumour cells are arranged in broad sheets of polygonal cells. Giant cells are present but are not nearly as numerous as in the parent tumour nor are they as large. In the right adrenal the tumour infiltrates the medulla widely and invades the cortex. An extremely interesting feature is the formation of gland-like spaces lined by tumour cells.

Diagonsis.—Malignant thymoma of the giant cell reticular variety and a transition to simplex and adeno type, with invasion of the trachea and superior vena cava and metastases to both adrenals.

SIMPLE CARCINOMA

This group has already been defined and its relation to the diffuse reticular cell tumours demonstrated both in the literature and in the preceding case. The case that follows therefore, needs no special comment.

CASE 9

Clinical examination.—Male, H.S., aged 47, entered the hospital November 4, 1927, complaining of pain in the chest, abdomen and swelling of the right side of the neck, of ten weeks' duration. The dyspnœa had become progressive and required him to adopt the orthopnœic position. Cough latterly became productive. Dilated veins on the thorax had been present for one month. The pain in the abdomen was burning in character.

Physical examination revealed a mass in the neck extending from below the right clavicle and marked substernal dullness occupying 7 cm. of the thorax on either side of the midline. Veins of the thorax were prominent and dilated. No abdominal findings reported. Temperature 98.6°, pulse 84, respirations 20 and blood pressure 160/90.

Laboratory examination.—Roentgen: A large shadow extending equally on both sides of the midline in the superior mediastinum. *Hæmatological*: Red blood cells 4,500,000; white blood cells 10,200; polymorphonuclears 77%; lymphocytes 23%. *Serological*: Blood Wassermann plus three.

Clinical course.—Was progressive and rapid with increasing dyspnœa and signs of occlusion of the superior vena cava. Patient died on November 30, 1927.

PATHOLOGICAL SUMMARY

Gross findings.—A large firm tumour was present in the right side of the neck intimately associated with the great vessels of the right side. Its posterior boundary was the trapezius muscle and anteriorly it passed under the clavicle toward the midline to become continuous with a large mass occupying the greater portion of the superior mediastinum. Its lateral aspects in this position were covered by thin layers of the upper lobes of both lungs. Posteriorly the œsophagus and descending aorta were displaced to the left by the tumour. Posteriorly and laterally it invaded the hilar glands and although the lungs were intimately related to it they were not grossly invaded.

There were metastases to the axillary glands as well as the mesenteric nodes of the abdomen.

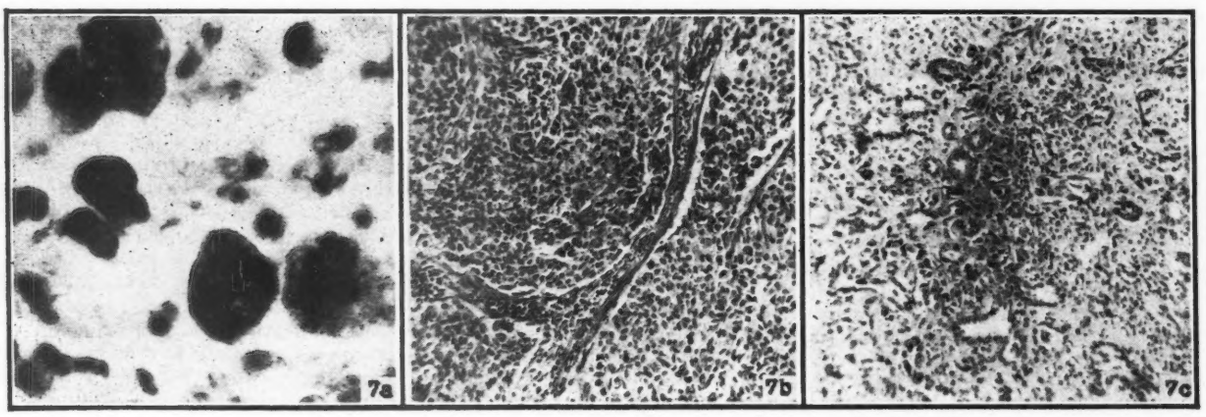

Fig. 7. (Case 8).—Diffuse giant cell reticular thymoma. (*a*) Shows giant cell constituents of primary tumour site. (*b*) Shows medullary conformation of metastatic tumour in left adrenal. (*c*) Shows glandular arrangement of metastatic tumour in right adrenal.

Microscopical findings.—The main tumour mass and its metastatic sites show a similar cytological structure. The cells are of moderate size, polygonal in shape, contain scanty ill defined cytoplasm and relatively large vesicular nuclei varying markedly in size and shape. They are generally hyperchromatic, vesicular and contain a large eosinophilic nucleolus. Mitotic figures are numerous.

The cells are arranged in broad sheets or anastomosing cords between which there is a delicate connective tissue stroma. In some places the cells are diffusely invading fat and connective tissue. Both veins and lymphatic vessels can be seen to be plugged with tumour. A perithelial arrangement of the cells is present in some areas but this arrangement seems to be due to survival of tumour about blood vessels in necrotic areas.

Diagnosis.—Malignant thymoma of the simple medullary carcinomatous variety with invasion of the lungs and superior vena cava and metastases to the cervical, peribronchial and periportal lymphnodes.

THYMOMA ASSOCIATED WITH SYSTEMIC ENTITIES

Having brought Hodgkin's disease and leukæmia into the folds of thymic oncology the problem of inter-relating these diseases more generally thought of as systemic entities becomes immediate. They affect the thymus in many instances and in some predominantly so. When the process can be proved to have arisen in the thymus, to have remained fairly well limited to its anatomical domain, and to conform to the criteria of other thymomata, their consideration must be that of a thymic tumour. When the lymphomas are obviously widely systemic and only incidentally involve the organ in their course, the problem does not appear to be under our immediate jurisdiction.

Lymphatic leukæmia.—The literature is indebted to Duanez and Castellanos[15] for their collection of 100 cases of tumours of the thymus accompanied by leukæmia. Although the numerical breakdown is not made some of these have occurred as primary tumours with the blood picture altering secondarily. It is interesting to note that in their paper 55% of the cases occur under the age of thirty. This is significantly comparable to thymic sarcoma. The heavy male preponderance correlates nicely with the remainder of the thymomata. The disease as it affects the thymus runs an especially virulent and rapid course, the average duration being seven and one-half weeks.

The thymus was affected secondarily in several cases of myeloid leukæmia appearing at our hospital and our reported case falls into that category.

CASE 10

Clinical examination.—Male, S.M., aged 27 years, was admitted December 18, 1931, complaining of pain in the right chest and shortness of breath. Two months prior to admission he noted two enlarged right inguinal nodes. These were followed by other nodular enlargements predominantly in the subcutaneous tissue of the abdomen. His chest pain and dyspnœa commenced one month prior to admission and two weeks later a non-productive cough developed. Weakness had become a late symptom.

On physical examination, enlarged bilateral epitrochlear, cervical and axillary nodes were found. The right chest was somewhat larger than the left and presented signs of a large amount of fluid with mediastinal displacement to the left. He had a remittent fever of 102.2° F.

Laboratory examination.—Roentgen: Evidence of a dense shadow obscuring the whole right lung which has displaced heart and other mediastinal contents to the left. *Pathological*: Bloody pleural fluid contained abundance of lymphocytes and a few myelocytes. Biopsy of skin nodule—leukæmia. *Hæmatological*: White blood count rose from admission value of 15,950 to 105,000 terminally. Differential on December 26, 1932, revealed: polymorphonuclears 7%; lymphocytes 55%; eosinophiles 7%; monocytes 5%; meta-myelocytes 1%; neut. myelocytes 8%; eos. myelocytes 8%; pre-myelocytes 9%. Red blood cells 5,040,000.

Clinical course.—Patient expired on February 10, 1932, following severe dyspnœa and cachexia.

PATHOLOGICAL SUMMARY

Gross findings.—Enlargement of the cervical, epitrochlear, and inguinal glands was present. Several subcutaneous nodules were found over the pectoral musculature.

There was a large tumour mass occupying the anterior mediastinum. This lay over the heart and was firmly attached posteriorly to the pericardium. This terminated above at the suprasternal notch and below at the diaphragm. It measured 26 by 3 by 2 cm. Laterally it invaded the upper and lower lobes of the right lung.

Of the abdominal organs, both the spleen and right kidney showed invasion by irregular islands of white, firm tumour.

Microscopical findings.—The main thoracic tumour and other sites show a diffuse cellular mass consisting of small round cells with little visible cytoplasm and a vesicular nucleus. Also present are large cells of the order of myelocytes with an eosinophilic granular cytoplasm. The bone marrow is typically that of myelogenous leukæmia.

Diagnosis.—Acute myelogenous leukæmia with multiple myeloid nodules in the skin, pleura, right lung, right kidney and myeloid metaplasia of spleen, liver, lymph nodes and a large thymoma of the myeloid type.

HODGKIN'S DISEASE

Mediastinal Hodgkin's disease has been known long and well by clinicians as an especially virulent and often times distinctly localized entity. Its rare occurrence in the thymus poses several interesting problems. If the theory is correct that Hodgkin's disease is a reticulo-endothelial neoplasia, where is its histogenic source of origin in the thymus? As far as is known a reticulo-endothelial tissue capable of giving rise to lymphoid elements is lacking in the thymus. The epithelial reticulum might be considered as an analogous entity but certainly not as identical in origin, function or characteristics.

From a morphological standpoint the thymic condition is not similar to the classical disease as described. The giant cells which occur are

much more numerous, hyperchromatic and pleomorphic. Reporters have consistently avoided designating them as Dorothy Reed or Sternberg cells.

There are two obvious alternatives to consider. One is that the more generally accepted theory regarding Hodgkin's disease is incorrect; the other is that one is dealing with a reticular cell tumour of a mixed cell nature and attended by fibrosis. Our case, although having the general features of Hodgkin's disease, is questioned on the basis of the typical giant cells.

CASE 11

An ambulance was called for the white male, E.M., aged 26, who was found to be in a precarious condition suffering from obstructive asphyxia. A tracheotomy was performed at once without affording relief since the obstruction was mediastinal. Cyanosis, dyspnœa, and pain increased until death occurred three days later.

PATHOLOGICAL SUMMARY

Gross findings.—Upon incising the skin and subcutaneous tissue over the sternum, a necrotic mass was found which extended through the sternum to become continuous with a mediastinal neoplasm weighing 2,000 gm. and measuring 20 by 11 by 13 cm. It occupied the entire superior and anterior mediastinum. It was greyish white in colour and firm in consistency. Behind, it enmeshed the trachea, came forward above and surrounded the arch of the aorta on the left and constricted the superior vena cava on the right. Laterally it ran over the hilum of the right lung and invaded the parenchyma for a distance of one centimetre.

The lymph nodes of the cervical region were enlarged and matted together as were those of the axilla. The larger mass of nodes measuring 2 cm. in diameter and section shows the same characteristics as the parent body. That is, the surface was a light grey in colour and broken by white strands of fibrous tissue. The nodes of the gastrohepatic omentum were likewise affected.

Microscopical findings.—Sections through the mediastinal mass show tumour arranged in lobules divided by fibrous tissue. Within the lobules there is a variable amount of diffuse connective tissue reticulum surrounding groups of cells and even individual cells.

The cell type varies a great deal. Some areas are composed almost entirely of lymphocytes while others contain an abundance of lymphocytes scattered throughout which there are many large polygonal cells. These are formed of moderate amounts of slightly eosinophilic cytoplasm and vesicular nuclei. Many of these larger cells are in mitotic division. A few reach giant dimensions and contain large hyperchromatic nuclei while others are multinucleated. Eosinophiles and polymorphonuclear leucocytes are present in considerable numbers.

No metastases are present in organs other than the cervical, axillary and gastro-hepatic lymph nodes. The bone marrow was not examined histologically.

Diagnosis.—Malignant thymoma of the Hodgkin's variety with metastases to the cervical, axillary and gastro-hepatic nodes.

SUMMARY

An endeavour has been made to outline the scope of the problem of malignant thymoma and to solve at least a few of the apparent conflicts which have made analysis so difficult, by:

1. Outlining briefly the histogenesis of the thymus which makes it necessary to consider the organ and its neoplastic derivatives as arising from two cell systems; one lymphoid, the other epithelial.

2. Pointing out the extreme morphological similarity of the two systems in conditions of neoplasia.

3. Histopathologically, drawing the criteria of distinction between the main groups of thymic neoplasms.

4. Presenting cases illustrating the various types of malignant thymoma.

5. Systematizing their inter-relations and position in thymic oncology.

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[Additional references may be had from the authors.]

It must be admitted that the evolution of plans for improvement in medical services on a local autonomy basis is discouragingly slow. It does not keep pace with advances in medical science or with improvements in technique of administration. But it must be remembered that the evolution of social structure under the principles of democratic government is a slow, tedious, discouraging, painful process. Yet, somehow, despite all its faults, we like it.—W. G. Smillie, *J. Am. M. Ass.*, **128**: 1005, 1945.

TWO CASES OF ANTERIOR MEDIASTINAL ABSCESS*

By Major Michael Aronovitch and Major Arthur M. Vineberg, R.C.A.M.C.

ANATOMICALLY, there is little reason for the formation of abscesses in the anterior mediastinum. There are no important structures in this space. It contains a few lymph nodes, some loose areolar tissue and the remains of the thymus. A substernal goitre may bulge into it. Dermoid cysts and teratomas may occur here. But whereas the other mediastinal spaces are relatively prone to infection which may track down from the nasopharynx or cervical regions the anterior mediastinum is so separated by fascial layers that there is no such direct pathway for infection. Perforation of the œsophagus is a relatively common cause of posterior mediastinal abscess but does not enter at all in the etiology of anterior mediastinitis.

Direct infection of the anterior mediastinum from without can occur in perforating wounds of the anterior chest. In Hare's collection of 115 cases in 1889 trauma of the chest was the most frequent cause of suppuration. It is conceivable that perforation into the mediastinum can occur with perforation of the sternum in such procedures as sternal marrow punctures or marrow transfusions. Ravitch, in 1943, reported a case following intrasternal blood transfusion.

In such cases of direct antecedent trauma the diagnosis would be suspected. In many cases, however, the cause of suppuration is less obvious. Chester Keefer reported 18 cases in 1938. Nine of these cases were acute abscesses in which causes were osteomyelitis of the sternum, cellulitis of the neck, ulceration of the larynx, infarct of the lung and pneumococcal infection. Some of these cases were probably superior mediastinal abscesses rather than actual anterior mediastinal suppurations. The remaining nine cases were due to syphilitic mediastinitis and mediastinopericarditis, the latter probably of rheumatic origin. In two cases the cause could not be determined. In his article Keefer mentions tuberculosis, syphilis and actinomycosis as the most common causes of anterior mediastinitis.

*From the wards of the Montreal Military Hospital.

The anatomical contents and boundaries of the anterior mediastinal space would lead one to suspect that infections of the mediastinal glands, infections at the lung roots, and contiguous pericardial or pericardio-pleural inflammations are the most common causes of anterior mediastinal abscess; excluding the traumatic cause mentioned above. In mediastinal lymphadenopathy the most common causes mentioned by Lester Paul in 1943 are tuberculosis and infections by fungi and yeasts such as actinomyces, blastomyces, coccidioides, aspergillus, streptothrix and torula. Excluding tuberculosis, actinomycosis would be the only one which could be relatively common. Suppuration of the glands might also occur due to infections in the lung or pleura.

There remain cases where the infection is presumed to be hæmatogenous because no other cause can be found. No reason can be advanced for localization of the process in the anterior mediastinum. Lester Paul mentions that extension up through the diaphragm is rare.

SYMPTOMS AND SIGNS

The symptoms and signs are variable and do not often point to a definite diagnosis. A history of trauma which could involve mediastinal structures is invaluable. The trauma may have been slight and may even have been indirect.

The constitutional symptoms and signs of suppuration are of course present. Localizing signs may be entirely lacking or may be so confusing as to suggest entirely different diseases. There is usually complaint of pain in the chest; this need not be retrosternal but may be on either side and may be referred to the base of the neck. If the abscess tends to point to one side or the other local reddening and bulging may appear in an interspace. The diagnosis of suppurative intercostal lymphadenitis may then be entertained as it may be thought that there is an underlying costal osteochondritis. Operation may then reveal the true condition.

If the abscess becomes large there is more likely to be complaint of substernal oppression and the symptoms and signs of pressure on the heart, great vessels and trachea begin to appear. Dyspnœa and accelerated pulse become especially prominent and the pulsus paradoxicus of pressure on the heart becomes evident. Cyanosis may become marked and orthopnœa and anxiety will then give the patient a character-

istic appearance. If the enlargement has been sudden the retrosternal pain coupled with the other symptoms may then suggest acute pericardial effusion or acute coronary occlusion. Œdema of the upper extremities and head and neck have been described with large abscesses.

Electrocardiographs taken at this time show T wave and S.T. changes which are similar to those of pericardial effusion or coronary disease.

The x-ray is invaluable in diagnosis. The usual antero-posterior and postero-anterior views will usually settle the confusing question of pericardial effusion although the coexistence of small effusion causing or due to the mediastinitis may still confuse the picture.

A lateral film is especially valuable in these cases and should always be taken when there are general signs of suppuration and chest pains. If the posterior border of the sternum is carefully inspected the abscess can be located.

Definite and final diagnosis can then be established by aspiration. The needle is inserted in the suspected interspace close to the sternal border and is then directed across the under part of the sternum. The aspiration of pus settles the question.

TREATMENT

The only specific treatment is operation. Without this the prognosis is extremely poor. Other measures may be carried out and chemotherapy is, of course, helpful but surgical drainage is necessary. The extent of surgical interference will vary with the individual case and with the size of the abscess. Removal of a rib cartilage or two should be sufficient in most cases.

Since there is very little to fill up the mediastinal space healing may be slow. If the case has been due to infection with tuberculosis or fungi this also will retard the healing process.

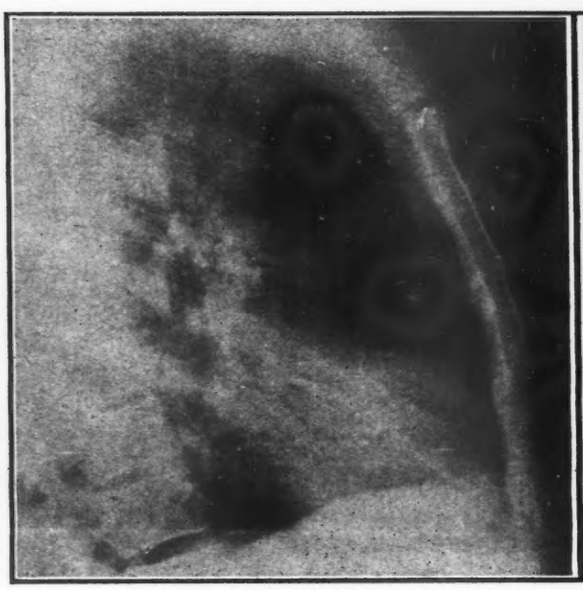

Fig. 1

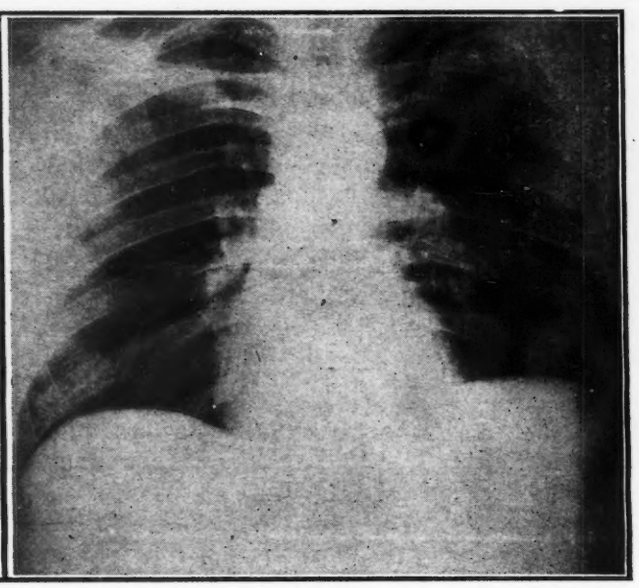

Fig. 2

Fig. 1.—Lateral film of chest. The arrow points to a faint shadow behind the sternum. The joint space between the manubrium and the body of the sternum appears widened.
Fig. 2.—Conventional postero-anterior plate of chest showing the high left hemidiaphragm on admission.

CASE 1

L.D., a 42-year old sapper was admitted to the medical ward of the Montreal Military Hospital on February 21, 1944, complaining of pain in the chest.

Four days before admission he had felt very well. While helping to lift a heavy stone he felt a sudden, severe, acute pain in his right chest. He kept on working but could not sleep that night for the chest pain. Next morning he had some fever and later was admitted to hospital as a case of influenza with a fever of 104° F. The admitting officer thought there were some râles at both bases, diagnosed pneumonia and started him on sulfa therapy. This had some apparent effect on the temperature which subsided somewhat in the first two days but then climbed again and remained high.

An x-ray of the chest had been taken the morning after admission but had shown no evidence of intrathoracic disease.

The patient still complained of pain in the right chest, more especially in the second interspace close to the sternum. February 23, some fullness appeared in this interspace and a needle was inserted. Pus was obtained when the needle was directed downwards beneath the sternum. Postero-anterior and lateral x-rays were taken at this time. The postero-anterior plate was essentially negative but the lateral film showed a fullness beneath the sternum. (Fig. 1).

At operation a needle was again inserted into the abscess cavity and thick pus obtained. A transverse incision was then made along the course of the second right costal cartilage and the needle followed to the abscess.

Deep to the pectoral fascia pus was encountered which was welling up through a small hole between the second and third costal cartilages. There was a similar hole not quite as large between the first and second costal cartilage.

The second costal cartilage was removed, the right pleura reflected laterally and an abscess about two inches in diameter found beneath the sternum. The posterior wall of the abscess was resting on the aorta. The abscess cavity was lightly packed with bipp.

The pus from the abscess yielded Gram-positive cocci which seemed to be staphylococci. No acid fast bacilli were found by smear or later guinea-pig inoculation.

The postoperative course was complicated by bronchitis and sulfathiazole sensitivity which caused some fever on March 13. The wound was slow in healing, and the man returned to his unit on April 28.

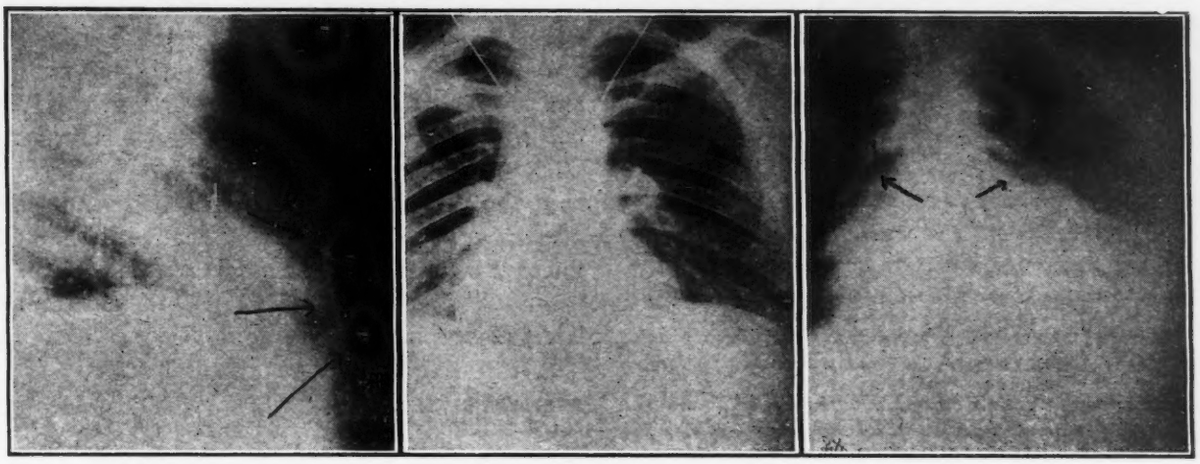

Fig. 3 Fig. 4 Fig. 5

Fig. 3.—Lateral film taken at same time as Fig. 4 and showing the abscess shadow retrosternally. **Fig. 4.**—Postero-anterior plate of chest taken several hours before clinical signs of pressure on heart and great vessels appeared. The left hemidiaphragm is still high. The superior mediastinum appears wider than formerly. **Fig. 5.**—Antero-posterior plate showing pyo-pneumopericardium after aspiration of the pericardial cavity and air replacement.

Comment

In the above case the patient was fortunate in the fact that a small swelling occurred in the second right interspace. Had the abscess burrowed deeper into the mediastinum or pointed elsewhere the result might have been entirely different. When he had a high fever with chest pain and a clear postero-anterior x-ray of the chest a lateral chest film could have established the diagnosis much earlier. This illustrates the desirability of taking such x-ray films in this type of case.

Indirect trauma during lifting had apparently contributed to the localization of the abscess.

Case 2

J.R.D., a 29-year old private, was admitted to the medical ward of the Montreal Military Hospital on March 2, 1944, complaining of pain low in the left chest radiating to the left shoulder. The pain had started on the morning of February 26, and was made worse by deep breathing. There was also a feeling of general malaise.

He gave a history of chronic cough since December, 1943, when he had had an attack of influenza, but nothing else of note. The day preceding the onset of his pains he had been in a minor automobile accident in which a truck he was driving crashed into a vehicle in front of him. In this crash he hurt his chest against the steering wheel of his truck but had thought nothing of it.

On admission the diagnosis was considered to be left diaphragmatic pleurisy. This was supported by the x-ray finding of a rather high left diaphragm (Fig. 2) which was relatively immobile on fluoroscopy.

Sputum was negative on repeated examinations, the white blood count was elevated (13,000) and the corrected sedimentation rate (Wintrobe method) was 36 mm. Differential count added nothing of significance to the picture.

He continued to run a low grade fever but his pains became less severe until the last week in March when he began to complain of drenching night sweats; and a slight upward trend to about 100° F. daily was noted in his temperature curve. At this time it was thought he might have a subphrenic abscess and an intravenous pyelogram was done to see if the kidney shadows were in their normal positions. This test was negative. On April 4 postero-anterior and lateral films of the chest were taken. About 4 p.m. that day he began to feel much worse. He complained of retrosternal pain and his pulse was rapid and thready. His breathing became rapid and shallow. The heart sounds were regular but had become a little distant. About 8.00 p.m. he began to become cyanosed and oxygen therapy was started.

At this time the plates taken earlier in the day had not yet been seen and the following diagnoses were entertained: Acute coronary occlusion; pulmonary embolism; spontaneous pneumothorax; diaphragmatic pleurisy which had extended to the mediastinum and now caused a mediastinitis with possible abscess; pericarditis.

In view of the fourth and fifth possibilities sulfa therapy was started. His condition became rapidly worse during the night. The lateral x-ray film was now available and showed evidence of a mediastinal abscess (Fig. 3). The postero-anterior film at this time showed little if any evidence of pericardial effusion (Fig. 4).

An electrocardiogram showed marked elevations of S.T. segments in leads I, II and IV. These changes were thought to be due to pressure on the heart.

A needle was inserted into the fourth left interspace and directed beneath the sternum. Pus was obtained: after some of the pus was aspirated the general condition improved somewhat. He was immediately taken to the operating room where the fifth left costal cartilage was

resected and the mediastinal abscess opened. The pus from the abscess gave an odour suggestive of *B. coli* when first opened.

Condition continued good after operation until 10 o'clock next morning when he again began to have thready pulse, which was now paradoxical, and difficulty in respiration. The incision was draining well but the heart seemed to be pushed forward into the wound.

A portable x-ray now showed a huge heart shadow which was diagnosed as a pericardial effusion. Pericardial aspiration was done and 300 c.c. of pus removed. Some of this was replaced by air: (Fig. 5) 10,000 units of penicillin was injected into the pericardium at the same time.

The patient was again operated on and the pericardial cavity opened after resection of the sixth left costal cartilage. Large quantities of greyish-green foul-smelling pus, suggestive of *B. coli* in odour, were obtained. Penicillin 10,000 units q. 3 h. intravenously was started.

After operation a needle was inserted into the left pleural cavity. Fifty c.c. of non-odorous greenish turbid fluid were obtained and 10,000 units penicillin placed in the pleural space. The patient improved markedly after these procedures. Pulse and blood pressure were good. Colour improved and so did the general circulation. Intravenous therapy, penicillin and oxygen were kept up but by next morning pneumonia had developed on the right side and the patient died April 8.

Autopsy

Autopsy was obtained but was limited to a thoracic incision. The autopsy showed that the tissue beneath the sternum was grey and necrotic and contained a small quantity of thin grey pus with yellowish particles of tissue. This was not malodorous and the abscess cavity did not extend beyond the right border of the sternum or into the left pleural space. A small opening 0.5 cm. was found in the underlying pericardium.

The parietal and visceral layers of pericardium were thickened and covered with shaggy yellowish grey fibrinous exudate. No collection of pus was found.

The heart weighed 510 gm. and the left ventricle measured 17 mm. in thickness. The heart was otherwise not remarkable.

The left pleural space showed a small amount of fibrinous exudate in the costophrenic angle and on the under surface of the lower lobe. The right pleural space was clear. The right lung weighed 1,000 gm. and showed more marked patchy consolidation and œdema than the left side.

The abdominal viscera were examined through the thoracic incision. The anterior wall of the cæcum was found firmly adherent to the antero-lateral abdominal wall. The appendix lay curved forward over the anterior wall of the cæcum and between it and the anterior abdominal wall. An oval brown hard fæcolith 1.5 cm. in length and 0.6 cm. in diameter lay on a fibrinous bed in the adhesions between cæcum, appendix and anterior abdominal wall. A hole 0.5 cm. in diameter was found in the wall of the appendix a centimetre from the distal end. The distal end was covered with a smooth fibrinous exudate and was adherent to a loop of the terminal ileum. A bead of creamy pus was found in this adhesion.

The liver weighed 2,800 gm. There was a large abscess cavity with a capacity of about 300 c.c. between the left lobe of the liver and the fibrous portion of the diaphragm immediately beneath the pericardium. This cavity contained non-odorous, thin, brownish pus and fragments of yellowish grey necrotic tissue. The wall of the cavity consisted of a layer of firm white fibrous tissue 1 to 2 mm. in thickness. The left lobe of the liver immediately beneath the abscess showed an increase in greyish white tissue and yellow streaks but no actual gross abscess cavity. There were moderately firm adhesions between the under surface of this lobe and the anterior wall of the stomach. When these adhesions were broken some yellow pus exuded. The spleen weighed 600 gm. and was soft and red.

Facilities for bacteriology were limited. Smears from the pericardium showed disintegrating neutrophils, a rare small Gram positive rod and some Gram positive cocci. Cultures showed a very light growth of corynebacteria (not a recognized pathogenic strain). Cultures from the subphrenic abscess showed a light growth of green streptococci. Direct smear of pus from the region of the cæcum showed numerous long slender Gram positive threads with true branching and occasional fusiform swellings on the threads. Rare pale Gram negative rods were present. Cultures were not obtained from this region.

Comment

This is a much more complex case than the first one. There seems little doubt of the spread of a suppurative process from the appendiceal region to the liver and thence to the under surface of the diaphragm. This caused the signs of pleuritis on the left side. The spread to the anterior mediastinal space probably occurred from the pleura. It is probable that the antecedent trauma to the sternum had something to do with the localization of an abscess in the anterior mediastinum although there was no fracture or perforating injury. This abscess might have been discovered earlier had lateral plates been taken on or shortly after admission.

The pericarditis post-dated the mediastinal abscess as evidenced by the sequence of x-ray plates which show the sudden enlargement in the cardiac silhouette after the abscess had been operated on.

Summary and Conclusions

A review is given of the symptoms and signs of anterior mediastinal abscess. Two cases illustrating the condition are presented. The values of lateral x-ray films in diagnosis and of surgery in therapy are stressed.

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A hundred years ago the Boston Dispensary, with no trace of self-consciousness, classified its patients racially, as Bostonians, Americans, Hibernico-Americans, and Other People.—*New England J. Med.*

TICK-BORNE DISEASES OF MAN IN ALBERTA

By Malcolm R. Bow, B.A., M.D., C.M., D.P.H.*
and
John H. Brown, B.Sc.(Agric.), M.Sc.†
Edmonton

TICK-BORNE diseases have been recognized as a public health problem in Alberta. This is on account of the fact that reservoirs of such tick-transmissible diseases as spotted fever and tularæmia have been located in southern Alberta. They are found in the area reported by Brown[6] as being heavily infested with the spotted fever tick, *Dermacentor andersoni* Stiles.

The locating of these reservoirs followed the inauguration of the Alberta Rocky Mountain Spotted Fever Survey in the spring of 1938. This survey was organized as a co-operative effort, having been financed by the Alberta Department of Public Health and the International Health Division of the Rockefeller Foundation, while the Laboratory of Hygiene of the Department of Pensions and National Health assumed the responsibility for all of the laboratory work.

During the six-year period, 1938 to 1943 inclusive, it was found that the Rocky Mountain spotted fever tick, *D. andersoni* Stiles, was well established in the southeast part of the Province. Ticks infected with the spotted fever organism, *Dermacentroxenus rickettsi* Wolbach, were collected at Manyberries and Lethbridge.

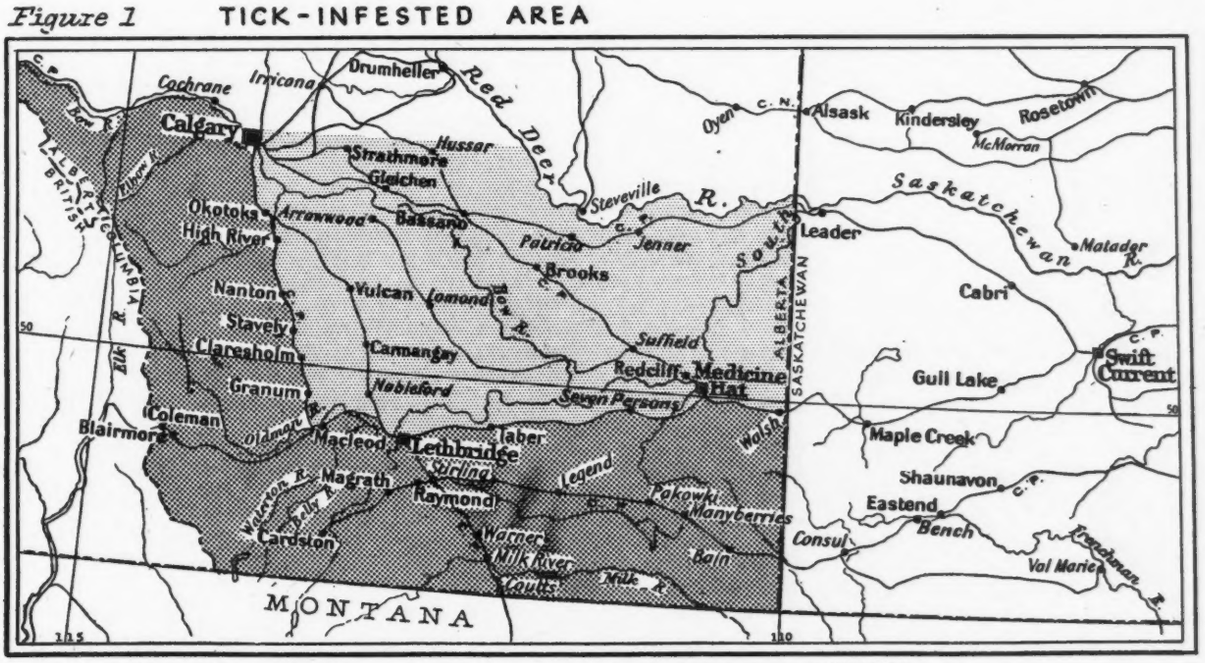
Sixteen collections of spotted-fever ticks made in the same general area were positive for *Pasteurella tularensis* McCoy and Chapin.

ROCKY MOUNTAIN SPOTTED FEVER

Rocky Mountain spotted fever is the most important of the tick-borne diseases because of its more frequent occurrence, its severity, its average high death rate, and the usual prolonged period of convalescence. The percentage of fatal cases is generally between 20 and 30.

The period between the tick bite and the first symptoms of infection (that is, the incubation period) varies from 2 to 14 days. In those areas in which the disease is severe it is usually 3 to 5 days, but where the less severe infections predominate it is commonly 5 days or longer. The onset may be gradual over a period of one day or more, or it may be sudden. If gradual, as is usually the case, the appearance of fever is preceded by a period that is mainly characterized by increasing weakness, but there may also be chilly sensations. A definite chill frequently follows. With the appearance of the fever some of the following symptoms are present: headache in the front or back of the head or both; eyes more or less bloodshot and often sensitive to

Figure 1 TICK-INFESTED AREA



HEAVY INFESTATION LIGHT INFESTATION

* Deputy Minister of Public Health; Associate Professor of Public Health, University of Alberta.
† Entomologist, Department of Public Health; Director of Rocky Mountain Spotted Fever Survey.

light; eye-balls sensitive to pressure; the tongue coated white with red edges; face with deep, dusky flush; pains in muscles, bones and joints; backache particularly in the lower portion; nose bleed; bronchial cough; vomiting; constipation; and marked weakness. In the case of the highly fatal type the rise in temperature may also be accompanied by a considerable increase in the pulse rate, but in districts in which the milder type of infection prevails, the pulse rate does not reach 100. The characteristic eruption, from which the name of the disease is derived, commonly appears between the third and fifth day of fever and is usually seen first on the hands or forearms, or the ankles and legs, less often on the back. This eruption is due to the breaking down of the walls of the small blood vessels in the skin and the resulting escape of blood (Alberta[1]).

HISTORICAL

Rocky Mountain spotted fever was first reported from Montana in 1873.[46] In 1896 Wood[48] gave a detailed account of the disease in Idaho, and this was followed in 1899 by Maxey's[23] report on Idaho cases. The disease was then known as an infection peculiar to the mountainous regions of Montana and Idaho, and was referred to as Rocky Mountain typhus fever, and the "blue disease". Its mode of transmission was unknown.

In the period 1902 to 1904 Wilson and Chowning[46] advanced the theory that it was a tick-borne disease, and in 1906 Ricketts[39] proved this theory to be correct and demonstrated that both the male and female tick could transmit the infection.

In 1906 King[20] carrying out an independent investigation confirmed Ricketts' findings. In 1907 Ricketts[40] indicated that spotted fever was primarily a disease of small wild animals. Maver[22] in 1911 demonstrated that the dog tick *D. variabilis* Say, could transmit the infection. Parker[27] in 1918 pointed out the relation of tick abundance to jackrabbit population, and recorded that Wolbach had demonstrated that jackrabbits were susceptible to spotted fever. In 1923 Parker[28] recorded the rabbit tick, *Hæmaphysalis leporis-palustris* Packard, as a transmitter of the infection in nature. Wolbach, Pinkerton and Schlesinger[47] in 1923 reported the culturing of the spotted fever organism, *Dermacentroxenus rickettsi.*

In 1923 Parker[29] recorded the stage-to-stage transmission of the spotted fever organism in the life-cycle of both *D. andersoni* and *Hæmaphysalis leporis-palustris.* In 1928 Parker[30] reported that spotted fever infection involved about one-eighth of the continental United States, particularly the central and western states.

Rumreich, Dyer and Badger[41] in 1931 recorded the occurrence of spotted fever in eastern United States, and in the same year Dyer, Badger and Rumreich[8] reported on the transmission of the infection by the dog tick *D. variabilis.* In 1932 Badger[2] collected naturally infected dog ticks in Virginia.

Parker, *et al.*[34] in 1937 recorded that spotted fever in man occurred in early spring and summer in the *D. andersoni* range, and during the late spring and summer in the *D. variabilis* range. In 1938 Bishopp and Smith[3] gave a detailed account of the importance and occurrence of the dog tick *D. variabilis,* in the eastern United States.

It is now known that Rocky Mountain spotted fever is primarily a disease of small wild animals. It is transmitted in nature by the spotted fever tick *D. andersoni,* the rabbit tick *H. leporis-palustris,* and the dog tick, *D. variabilis.* The infection can be passed from stage to stage in the life-cycle of both the spotted fever and rabbit tick. Man usually contracts the infection through the bite of an infected tick. The causative organism is *Dermacentroxenus rickettsi* Wolbach, and the severity of the disease in man depends upon the virulence of the organism. It should be stressed, however, that according to Parker[29] in 1923, only about 2% of *D. andersoni* are infected with the spotted fever organism. But even this low percentage may constitute a menace, depending, of course, upon the relationship of the tick population to the human and wild animal population.

CASES

There is considerable confusion in regard to the actual number of cases of this disease that have occurred in Alberta, and also as to the date of the first case.

In 1938 Hearle[19] reported that two cases of spotted fever, one of which was fatal, had occurred at Manyberries in 1936. In 1941 Gibbons and Humphreys,[11] reported that *D. andersoni* infected with spotted fever were present at Lethbridge and Manyberries.

Field investigations carried out by Brown[6] and reported in 1943, show that spotted fever ticks are well established in southern Alberta, particularly in that part lying south of the Canadian Pacific Railroad from Walsh to the Crow's Nest Pass (Fig. 1).

To date a total of six known cases and one suspected case of this infection in man have been reported. Four of the cases were fatal. The cases occurred at Medicine Hat, Manyberries and Orion, all located in the tick-infested area.

Protective measures against spotted fever infection through personal care and vaccination are well known, and have been practised on a large scale in the Manyberries district for the last three years. These measures are for the protection of human health and do not prevent in any way the maintenance, perpetuation or increase of mammals and ticks infected with spotted fever, or the extension of areas harbouring the same.

CASE 1

The first recorded case of Rocky Mountain spotted fever in Alberta occurred in 1935 when "A", an elderly farmer living on the North Branch of the Manyberries Creek, died from this disease. He took sick early in July and was admitted to the Medicine Hat General Hospital on July 25, 1935. He died on July 30, 1935.

CASE 2

This case occurred in 1936 when "B", aged 55, a farmer living one mile west of the North Branch of the Manyberries Creek, was admitted to the Medicine Hat General Hospital suffering from an illness following tick-bites. He was admitted on June 29 and discharged as recovered on July 31, 1936.

CASE 3

In 1936, "C", aged 61, a farmer living adjacent to "A" on the North Branch of the Manyberries Creek, was admitted to hospital on July 21. He died on August 1, 1936.

CASE 4

"D", an 18-year old school teacher living in the Seven Persons Coulee south of Medicine Hat, complained of feeling ill following tick-bites. He was admitted to hospital in July, 1940, and discharged shortly after as recovered.

CASE 5

In 1942 "E", an 82-year old former rancher, visited the Manyberries district during the first part of June. Shortly before June 20 he removed an attached tick from his person. On June 23 he was admitted to hospital. On June 27 a rash appeared. Death occurred on July 8, 1942.

CASE 6

In June, 1943, "F", a 55-year old farmer from Orion, about 7 miles west of Manyberries, was admitted to the Medicine Hat General Hospital. This man admitted having tick-bites. He developed a rash. Blood tests proved the presence of spotted fever. He was discharged as recovered.

Suspected case.—"G", about 40 years old, a rancher living in the bottom lands of the North Branch of the Manyberries Creek became ill and died following tick bites. This occurred during the summer of 1936. A definite diagnosis of Rocky Mountain spotted fever was not made, although there is good reason to believe that this man died from this disease, as infected ticks were taken in the immediate neighbourhood of his ranch home.

It will be seen therefore that of the six definite cases three proved fatal; it is further noted that all of the fatalities occurred at Manyberries.

TICK PARALYSIS IN MAN AND ANIMALS

All cases of tick paralysis in both man and animals have been recorded as following bites of the Rocky Mountain spotted fever tick, *D. andersoni*. The condition has been reported in man, sheep and cattle, and in all instances the cases occurred in heavily tick-infested areas.

Tick paralysis in man.—Tick paralysis is not of frequent occurrence. Very little is known about this disease, which results in a paralysis of the motor nerves. It is commonly believed to be caused by a toxin injected by the tick rather than by a disease organism. It usually follows the bite of female ticks and the initial symptoms appear about the fourth day after tick attachment.

It occurs more often in children than adults, presumably because the latter are more likely to find and remove ticks from their bodies. As observed in children, the first symptom is generally a lack of co-ordination of the leg muscles. The child is soon unable to stand. The paralysis gradually ascends and in a few days involves the muscles of the trunk and head. The involvement of the throat muscles affects swallowing and speech becomes difficult. Breathing may be laboured. Usually there is only a slight rise in temperature. The paralysis progresses rapidly, in the case of children, at least, and death is certain to occur in a few days unless the tick is removed before the respiratory muscles become too severely involved. On the other hand, if the tick is found and removed early, improvement is rapid.

Occasionally, especially in persons of mature age, the paralysis is localized, involving only an arm or a leg. In such instances effects are less serious.

The tick concerned is generally attached to some hairy portion of the body, frequently the back of the neck.

HISTORICAL

In 1912, Todd[44] working in British Columbia recorded a paralysis in man following tick-bites. In 1913 Hadwen[17] reported the occurrence of a paralysis in animals following tick-bites. Mail and Gregson[21] in 1938 listed a number of human cases of tick paralysis in British Columbia. Moilliet[26] in 1937 reviewed the occurrence of tick paralysis in cattle in British Columbia.

Since 1938 two cases of tick paralysis in man, and two cases of tick paralysis in sheep have been reported as occurring in Alberta.

Human cases in Alberta.—A young girl from the Cypress Hills district south of Medicine Hat was the first case of this disease. She suffered all the symptoms of tick paralysis, and was treated by a Medicine Hat doctor. Her recovery was complete.

A 21-year-old male member of the 1940 Alberta Rocky Mountain Spotted Fever Survey party was the second case. This man developed a partial paralysis of the left arm which continued for approximately 24 hours. At the end of this time a complete and detailed examination of his body was carried out, and a *male* spotted fever tick was found attached in the left axilla. This tick was removed and within twelve hours the paralysis disappeared, but a slight soreness

in the abdominal muscles on the left side persisted for two or three days.

Tick paralysis in sheep.—From information gathered since 1938 there is every reason to believe that tick paralysis in sheep is more common in southern Alberta than is generally realized. Sheep-men in tick-infested areas report that they lose many sheep every spring from a type of paralysis.

The first case observed in Alberta occurred in the Manyberries district in 1938. The second case occurred in the Milk River district in the spring of 1939. In both of these cases typical symptoms of tick paralysis were reported.

A Type of Paralysis from Eastend, Saskatchewan, Thought to be Caused by the Bite of the Spotted Fever Tick

Since 1938 there have been four cases of paralysis admitted to the Medicine Hat General Hospital from Eastend, Sask., for treatment. Three of the cases were fatal.

The conditions surrounding the occurrence of this type of paralysis are obscure, but it has been elicited that the illness developed subsequent to tick-bites in all cases. However, in no case were ticks actually found attached to the bodies of individuals suffering from the paralysis. The only reference that can be found in literature to a similar type of paralysis is one by Chumakov and Seitlenok[7] describing a condition known as "tick-borne encephalitis of man" that occurs in Siberia.

The following is a short summary of the cases from the Eastend district:

Case 1

"H", a 46-year old farmer from Eastend, admitted to hospital September 6, 1938. Died September 8, 1938.

Case 2

"I", a 16-year old youth. Worked at Eastend during July. Admitted to hospital July 27, 1939. Died July 29, 1939.

Case 3

"J", a 21-year old civil engineer. Worked at Eastend during summer of 1939. Admitted to hospital August 7, 1939. Recovered.

Case 4

Mrs. "K", a 31-year old housewife from Bench, Sask., admitted to hospital June 2, 1942. Died June 14, 1942.

It will be noted that three of the four cases proved fatal. The information obtained in regard to these cases came as a result of interviews with patients and their relatives, following admission to the Medicine Hat General Hospital. Dr. D. N. MacCharles of Medicine Hat was the first to recognize this condition.

Tularæmia

Tularæmia, which is also known as rabbit fever, and deer fly fever, is not so frequently fatal as is spotted fever, but is nevertheless a serious disease, and convalescence may extend over a period of many weeks. It is primarily an infection of small wild animals and has been found in the native fauna in various districts in the Province.

Tularæmia infection in man is accidental and occurs as the result of a direct or an indirect contact with the disease in nature. Infection may take place through the unabraded skin, but most frequently results from the contamination of an abrasion or a puncturing of the skin by an insect parasite or other agency.

Rabbits are the most frequent source of infection particularly jackrabbits and cottontails. Snowshoe rabbits are equally dangerous, but are less often killed and handled. Infection follows the contamination of some parts of the body, usually the hands or eyes, with infected tissues, while skinning, dressing, or otherwise manipulating the animal. Tularæmia is perhaps the disease most frequently concerned when rabbits die in large numbers. Rabbits found dead should always be viewed with suspicion.

Ticks are next in importance to rabbits as a source of infection, and the spotted fever tick is the one commonly concerned. Not only is its bite infectious, but also its excrement. The hands may be easily contaminated with the excrement or tissues of ticks when picking them from horses or other animals, and should be immediately cleansed.

Infection occurs less frequently as a result of handling the carcasses of rodents other than rabbits and of small carnivores, and following the bites of deer flies, and the bites of animals. Some cases have occurred in which the obvious site of infection was a scratch or puncture of the skin due to burs removed from the wool of sheep or to contact with sagebrush, rose briars, barbed wire, or other agency. The source from which these wounds became contaminated, however, has not been apparent. Infection by deer flies, which is reported in some sections of the Rocky Mountain region, need be feared only in those localities in which swampy conditions permit the breeding of these blood-sucking insects in considerable numbers. Infection by mos-

quitoes is probably rare, but may happen if a mosquito which has fed on an infected animal is crushed on the skin.

There are several types of tularæmia. The most common type, however, is that in which the site of infection is marked by an ulcer. There is an accompanying enlargement of the lymph glands that drain the site of infection; for example, if the site of infection is one of the hands, the glands at the elbow or in the axilla are usually the ones affected. Some times infection occurs through the tissues of the eye due to rubbing of the eye with fingers contaminated with infectious material such as animal tissue or tick excrement. In such cases the eye may be severely affected and the glands on that side of the face or neck are the ones that become enlarged. Occasionally, infection is acquired by way of the mouth, as for instance, by the eating of insufficiently cooked meat of an infected rabbit. In such cases there is no local ulceration or enlargement of the external glands.

The location of the ulcer that marks the site of infection depends to a considerable extent upon the infecting agency. If this is a tick, the ulcer is likely to occur on any part of the body except the feet; if a deer fly, on any exposed portion of the body, as the neck, face, hands, or arms; if from contamination through handling animal tissues, it is usually on one of the hands. Tick-bite cases occur in spring and early summer; deer-fly cases, in the summer and early fall; and cases resulting from handling animals, at any season of the year, but most frequently during the spring and summer.

The appearance of symptoms is frequently sudden and is generally accompanied by alternate periods of chilly sensations and fever. There is commonly a frontal headache and the eyes may be sensitive to pressure, but are seldom infected as in the case of Rocky Mountain spotted fever. Sweating may be profuse. There is usually a backache and shifting pains in the muscles. Weakness is very marked.

There is no specific treatment for this disease. Complete rest in bed is of the greatest importance. Relapses are not uncommon and may occur even six months or longer after the original illness (Alberta[1]).

HISTORICAL

Tularæmia is primarily a disease of small wild rodents, but it can be transmitted to man through the bite of an infected arthropod such as the deer fly, *Chrysops* spp., and the Rocky Mountain spotted fever tick, *D. andersoni;* by handling infected animals; and through the bite of infected carnivorous animals.

The disease was discovered by McCoy[24] in 1910 as a plague-like disease of ground squirrels in California, and the causative organism, *Pasteurella tularensis* (*Bacterium tularense*), was found and described by McCoy and Chapin.[25] The first known human case was diagnosed by Wherry and Lamb[45] in Ohio in 1914. Francis[9] working in Utah in 1919 demonstrated that a disease borne by the deer-fly in that state was tularæmia.

In 1924 Parker, Spencer, and Francis[36] reported the Rocky Mountain spotted fever tick, *D. andersoni* Stiles, as carrying *Pasteurella tularensis.* The infected ticks were collected in the Bitter Root Valley, Montana, during the course of spotted fever investigations. In the same year Parker *et al.*[36] also reported the rabbit tick *Hæmaphysalis leporis-palustris,* as a carrier of tularæmia infection. In 1931 Green[12] demonstrated that the dog tick *D. variabilis,* carried the infection in nature. Parker, Philip and Davis[33] in 1932 published evidence suggesting that the bird tick *Hæmaphysalis cinnabarina,* Koch was a transmitter of tularæmia in nature. Parker, Philip, Cooley and Davis[34] reported in 1937 that certain species of *Ornithodoros* and *Ixodes* may be incriminated in the transmission of tularæmia in nature and possibly to man.

In 1919 Francis[9] reported tularæmia-infected rabbits in Washington, D.C. In 1926 Parker and Spencer[35] recorded the natural infection of many species of wild animals in Montana, and in the same year they indicated that the coyote could contract tularæmia through eating infected rabbits. Perry[37] working in California in 1928 reported the California meadow mouse as carrying the disease, and in 1934 Schlotthauer, Olson and Thompson[42] recorded the presence of tularæmia in the wild grey fox.

In 1927 Parker and Butler[31] reported tularæmia infection in sheep in Montana. Parker and Dade[32] in 1929 recorded ticks as transmitting tularæmia to sheep. In 1935 Philip, Jellison, and Wilkins[38] reported on a serious outbreak of tularæmia in sheep in Montana.

In 1926 Green, Wade and Kelly[15] showed that the ring-necked pheasant was susceptible, and in 1929 Green and Wade[14] reported the infection in quail. Green and Shillinger[13] in 1932 reported the occurrence of natural infection in sharp-tailed and ruffed grouse. Parker, Philip and Davis[33] in 1932 recorded a tularæmia epizootic among sage hens.

Shaw and Jamieson[43] in 1932 reported on a human case of tularæmia in northern Alberta. This case was traced to handling infected animals.

In 1939 Gibbons[10] reported tularæmia-infected spotted fever ticks in southern Alberta. Gwatkin, Painter and Moynihan[16] in 1942 reported tick-transmitted tularæmia as causing the death of sheep in the Seven Persons Coulee, Alberta.

Tularæmia-infected jackrabbits in southern Alberta were reported by Brown[5] in 1943. Bow and Brown[4] in 1943 reported on tick-transmitted tularæmia in jackrabbits and Richardson ground squirrels in the Seven Person's Coulee, Alberta. Ticks collected from these animals were also infected.

Brown[6] in 1943 reported on tularæmia infected ticks in southern, central and northern Alberta.

There is a suggestion that such domestic animals as dogs and cats may contract the disease from eating infected rodents. From the available literature it is evident that when tularæmia is introduced into an area harbouring susceptible animals, which are hosts for one or more species

of ticks capable of carrying and transmitting tularæmia, human cases of tularæmia are likely to occur.

ALBERTA TICKS

A complete study of the species of ticks present in Alberta has never been made, but Brown,[6] in 1943, records that the following species capable of transmitting tularæmia have been collected:

Dermacentor andersoni, Stiles—spotted fever tick.

Hæmaphysalis leporis-palustris, Packard—rabbit tick.

Hæmaphysalis cinnabarina, Koch—bird tick.

CASES

Since 1938 two cases of tick-transmitted tularæmia in humans have occurred in southern Alberta. Both of these cases occurred in the area of tick abundance (Fig. 1). Tularæmia-infected ticks were recovered in the areas in which both of the cases occurred.

The two proved cases occurred on sheep ranches in heavily tick-infected areas.

CASE 1

This occurred in "L", a 35-year old sheep herder at Walsh, Alberta, during May, 1939. The following is a summary of the information gathered from the patient, the attending doctor, the patient's employer and a neighbour.

The Walsh district is mainly a sheep-ranching area but cattle and horse ranching is also carried on. The country is very rough, being on the north slope of the Cypress Hills, and the vegetation is mostly sage brush and short range grass.

Rocky Mountain spotted fever ticks are common throughout the whole district, and in 1939 were exceedingly plentiful with the first ticks appearing about April 25. During early spring the horses and sheep were heavily infested. Jackrabbits had been very abundant the fall and winter of 1938-39, but were rapidly dying, carcasses being found on the range in the early spring. Weasels trapped during the winter carried large numbers of host-ticks.

As ticks were plentiful on the range and on the sheep "L" received numerous bites, particularly on the neck, chest and scrotum. Most of these bites were caused by attached ticks, and these were not noticed and removed until local irritation caused the patient to examine himself. Frequently this irritation was not noticed for some time, and often the ticks were in an advanced stage of engorgement when removed.

On May 8, "L" felt unwell, and as the illness persisted he visited Dr. D. N. MacCharles in Medicine Hat on May 11. After an examination his doctor admitted him to the Medicine Hat General Hospital as a suspected tularæmia case.

Blood samples were taken on at least three different occasions and submitted to the Provincial Laboratory, and to Hamilton, Montana, for agglutination tests. Both the Alberta and Montana laboratories reported positive tularæmia findings.

The patient suffered no ulceration and very little glandular enlargement, and his disease was diagnosed as tularæmia. On July 2, 1939, he was discharged from hospital as recovered.

A collection of 75 drag-ticks taken on this sheep ranch during May, 1940, and examined at the Laboratory of Hygiene, Kamloops, B.C., were found to be infected with *P. tularensis.*

CASE 2

The second case appeared in a 35-year-old married woman in the Seven Persons Coulee; this case was reported by Bow and Brown[4] in 1943.

DISCUSSION

It is apparent that tick-borne diseases of man constitute a problem of some importance in Alberta. At present these diseases appear to be confined to the southern part of the Province. However, there are indications that further survey work might disclose a similar situation in the foothills and mountain area.

There is a possibility that tick-transmitted tularæmia may be of importance to the sheep industry. It has been observed that a considerable number of sheep die each year during the tick-season from some unknown disease; Gwatkin *et al.*[16] have shown that sheep are susceptible to this infection.

We are deeply indebted to the members of the medical profession of Medicine Hat for the information on the cases of spotted fever, tularæmia, tick paralysis and "Eastend disease". Dr. S. M. Schmaltz, Lethbridge, examined one of the human cases of tick paralysis.

Grateful acknowledgment is made to Dr. R. M. Shaw, Assistant Provincial Bacteriologist, University of Alberta; Dr. F. A. Humphreys, Bacteriologist-in-Charge, Laboratory of Hygiene, Kamloops, B.C., and Dr. R. R. Parker, Director, Rocky Mountain Laboratory, Hamilton, Montana, for their assistance in making the final determinations for spotted fever and tularæmia.

All members of the Survey assisted in gathering the information in this paper, but special thanks are due to Surg.-Lieut. W. R. Fraser, R.C.N. and J. L. Macleod, B.Sc., M.D., University of Alberta.

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HÆMANGIOMA PONTIS*

By Rudolf Altschul, M.U.Dr.

Saskatoon, Sask.

THE present report is published, not for the purpose of contributing another case of hæmangioma pontis to the already extensive literature, but to present a tentative explanation of the morphogenesis of this condition.

In the nomenclature and classification of hæmangioma there is little uniformity or logic. Some writers make a distinction between telangiectases and angiomas, others do not. Some include it among the true tumours, others regard it as a hamartoma or malformation. Attempts at subdivision into arterial, venous and capillary hæmangiomas add to the confusion which is further augmented by the existence of transitional forms ranging from mere vascular dilatations and convolutions to undoubted new growths. In some instances, as in the pampiniform plexus and in the vessels around the ovary, such vascular convolutions are a normal feature. But in such locations as the retina, when vessels which are normally straight become convoluted, or in varicosities, the classification may be much more difficult. On an anatomical basis it would be possible to distinguish two types, one consisting of a single long convoluted vessel, the other consisting of a mass that results from an increase in the number of vessels entering into it. The occurrence or absence of parenchyma between the vessel segments adds another distinguishing factor.

In this report I am using the term "hæmangioma" in its commonly accepted sense as equivalent to hæmangioma simplex or telangiectasis.

This vascular anomaly is comparatively common in the pons and numerous accounts appear in the literature, *e.g.*, by Cushing and Bailey, Neubuerger and Silcott. To these publications and to a survey by Courville the reader is referred for a more extensive discussion.

I had opportunity recently to examine a brain showing a hæmangioma situated in the pontine grey nuclei and completely restricted to them, the white tracts being free of any change. This distribution has been described by Courville who writes:

> "The anomaly seems to have its origin in the vessels which supply the pontine nuclei rather than those of the heavy fibre bundles of the tract."

and

> "Even in the larger lesions, the surrounding nerve tracts seem unaffected."

But, while Courville called attention to this peculiar distribution, he offered no explanation of it. However, since it is difficult to believe that these two closely related structures (the pontine nuclei and the tracts) have different blood supplies, the restriction of the lesion to the grey nuclei is remarkable and it is interesting to speculate on possible explanations.

The present specimen was obtained from a young man of nineteen years who had suffered from epileptic seizures for an unrecorded number of years. During the year which preceded his death he was a patient in a mental hospital and, at least for this period, epileptic attacks occurred once or twice a week, preceded and followed by confusion and even stupor. The degree of confusion varied but at no time during the period of observation was he mentally normal. This confusion increased to such an extent that for the last two months of his life he was described as stuporous. During his stay in the hospital recurring neurological signs were observed — choked discs, absence of abdominal

* From the School of Medical Sciences, University of Saskatchewan, Saskatoon, Canada.

reflexes, unilateral Babinski—which may be regarded as sequelæ of the epileptic seizures. Before death he developed hyperthermia with a final temperature of 106° F.

The post mortem examination showed flattening of the gyri and a pressure ring over the cerebellum, pons and medulla. On section through the pons a small petechial hæmorrhage was revealed which was identified later as a hæmangioma. The portions of the brain received for histological examination included the pineal gland, the left lenticular nucleus with the internal capsule, parts of the frontal and occipital lobes, the pons, the medulla oblongata and the cervical cord. Apart from the pons there was no abnormality.

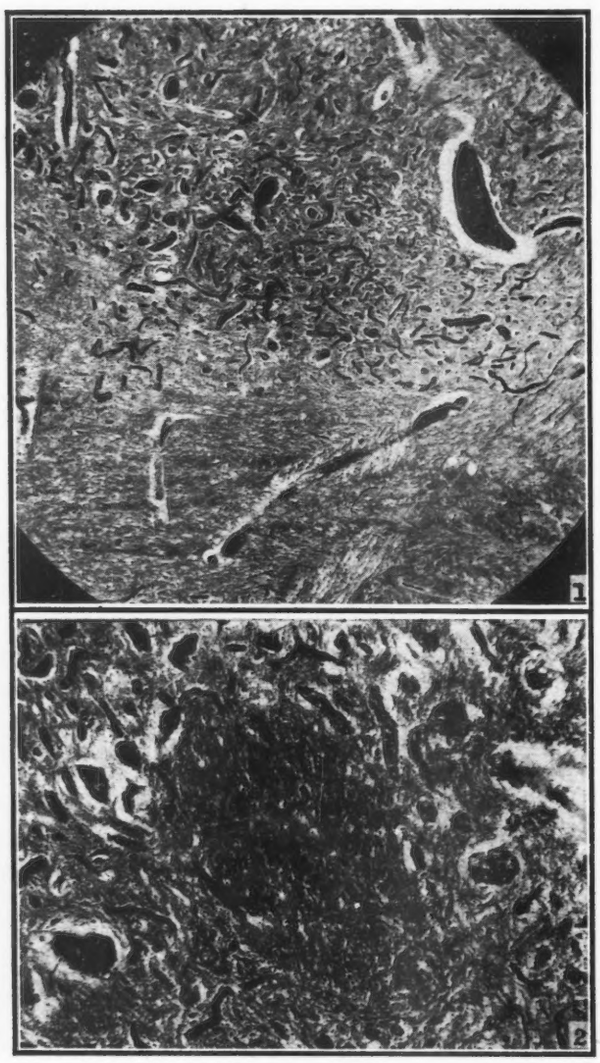

Fig. 1.—Upper field: numerous dark stained vessels in the grey substance of the pontine nuclei. Lower field: normal number of vessels in the white substance of the pons. Mallory's connective tissue stain, section 30 μ thick. x40.

Fig. 2.—The pontine fibre tract in the centre shows no numerical increase of vessels, in contrast to the surrounding gray substance. Mallory's stain without acid fuchsin, section 30 μ thick. x85.

In the ventral inferior and ventral middle portion of the right half of the pons, the routine 8-micron hæmatoxylin-eosin sections showed an excess of transverse and oblique sections of well filled vessels. Thereupon 30-micron sections were cut and stained with Mallory's connective tissue stain and with Foot-Hortega's reticulin stain. It was found that, in proportion to the thickness of their walls, these vessels were unusually wide and engorged with blood. Around the vessels were large perivascular spaces. It may be that these spaces should be regarded as artefacts although it would seem to be more reasonable to associate them with the œdema described in the post mortem report. Nervous tissue (grey substance) was found between all the vessels. The white substance of the numerous tracts showed no increase in vascularity.

The vessels themselves seem to be of two types if one judges from the structure of the vessel walls. Some are wide, very thin walled capillaries or sinusoids, while others are larger vessels with thicker walls. As is easily seen in Mallory's connective tissue stain the walls of these larger vessels consist almost entirely of collagenous fibres, indicating their venous character. However, it is difficult to be sure that they are veins since in the central nervous system there is frequently very little difference between arteries and veins.

There was some evidence to show that the convoluted vessels in the present case originated from vessels entering the (inferior) foramen cæcum. It should also be mentioned that the basilar artery itself and its branches were kinked. Here again it is difficult to decide whether the course was anomalous, whether it was caused by the œdema or whether it had resulted from handling prior to fixation.

DISCUSSION

Attention has already been called to the restriction of the lesion to the pontine grey nuclei. Different explanations may be put forward for this restriction. In the first place it should be kept in mind that the vascular network of the grey substance is much more dense than that of the white. Thus, the tumour formation or malformation might be regarded simply as a neoplastic exaggeration of this normal structural difference. This however does not provide a complete explanation of the malformation.

Another and better explanation seems possible. For years it has been known that there are convoluted vessels in the brain and spinal cord. When first described they were believed to be pathological. Later they were regarded as artefacts. Finally Pfeifer reported that they occur normally and he considered them to be a physiological device for controlling blood pressure. I studied these convoluted vessels and pointed out (1939) that they are found almost exclusively in man, and that while they are not abnormal they are very irregularly distributed in the central nervous system. An outstanding feature, previously unnoticed, was the fact that they are situated in the boundary between the grey and the white matter. My observations did not support Pfeifer's view that they have a physiological function. I concluded that the convoluted vessels of the brain and spinal cord are to be regarded as a regularly occurring malformation due to *different rate and direction of growth of the grey and white substances.* Later (1944) I studied the occurrence of these convoluted vessels in pathological cases and I was able to describe in several cases of epilepsy a numerical increase of convoluted vessels and their frequent intracortical occurrence. In two cases of Huntington's chorea, convoluted vessels were found deep in the white substance.

It would appear that a similar mechanism of growth differences, as was assumed in the case of the convoluted vessels of the brain and spinal cord, may also be responsible for the formation of the hæmangioma pontis. Discordant growth factors have previously been held to be responsible for the formation of angiomas of the face. In the pons the downward growth of the longitudinal pyramidal tracts and the lateral growth of the ponto-cerebellar tracts might easily disturb the course of the ingrowing blood vessels which in general run perpendicular to the direction of these tracts. At any rate, in the pons, factors are present that in other situations are believed to have resulted in the production of convoluted vessels and actual angiomas. If this be the case, angioma pontis may be considered as analogous to the convoluted vessels of the grey-white boundary. In the case of the pontine grey nuclei the masses of grey matter are so small that it is impossible to decide whether the convoluted vessels occur only in the boundary zone. Actually the nuclear areas were completely occupied by vessels.

It is interesting to note that the patient in this case was an epileptic and epilepsy has frequently been reported in cases of angioma pontis. I have already pointed out (1944) an increase in the convoluted vessels in certain cases of epilepsy. The vascular origin of epilepsy is a view so widely held that it requires no elaboration here.

These observations suggest an analogy between angioma pontis and the convoluted vessels of the brain and spinal cord and provide a possible explanation of the development of the angioma. It is, however, not a complete explanation. There must be an additional unknown factor responsible for the incidental and unilateral development.

SUMMARY

A case of hæmangioma simplex is reported, which was found in the nuclei pontis and did not involve the neighbouring nerve tracts. The patient had shown frequent epileptic seizures. Two tentative explanations are offered. One is concerned with the different vascular density in the gray and white substances, the other with their different rate and direction of growth. The latter view brings the angioma into relation with the normally occurring convoluted vessels of the central nervous system. These convoluted vessels had been previously found to be more developed in the brains of some epileptics.

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THE SIGNIFICANCE OF RECURRENT OSGOOD-SCHLATTER STRAIN

By Captain O. T. Steen

DISABILITIES related to the knee area form an important group of orthopædic problems, especially in war medicine. It has been thought a point of significance to find radiological evidence of abnormality in the tibial tubercle area in approximately 5% of all knee examinations done at Shilo Camp Military Hospital, April 1, 1943 to August 1, 1944. Fourteen cases of so-called Osgood-Schlatter strain have been collected and studied. The object of this paper is to correlate the radiological and clinical aspects of the condition in an attempt to give a more accurate appraisal of its importance as a disability.

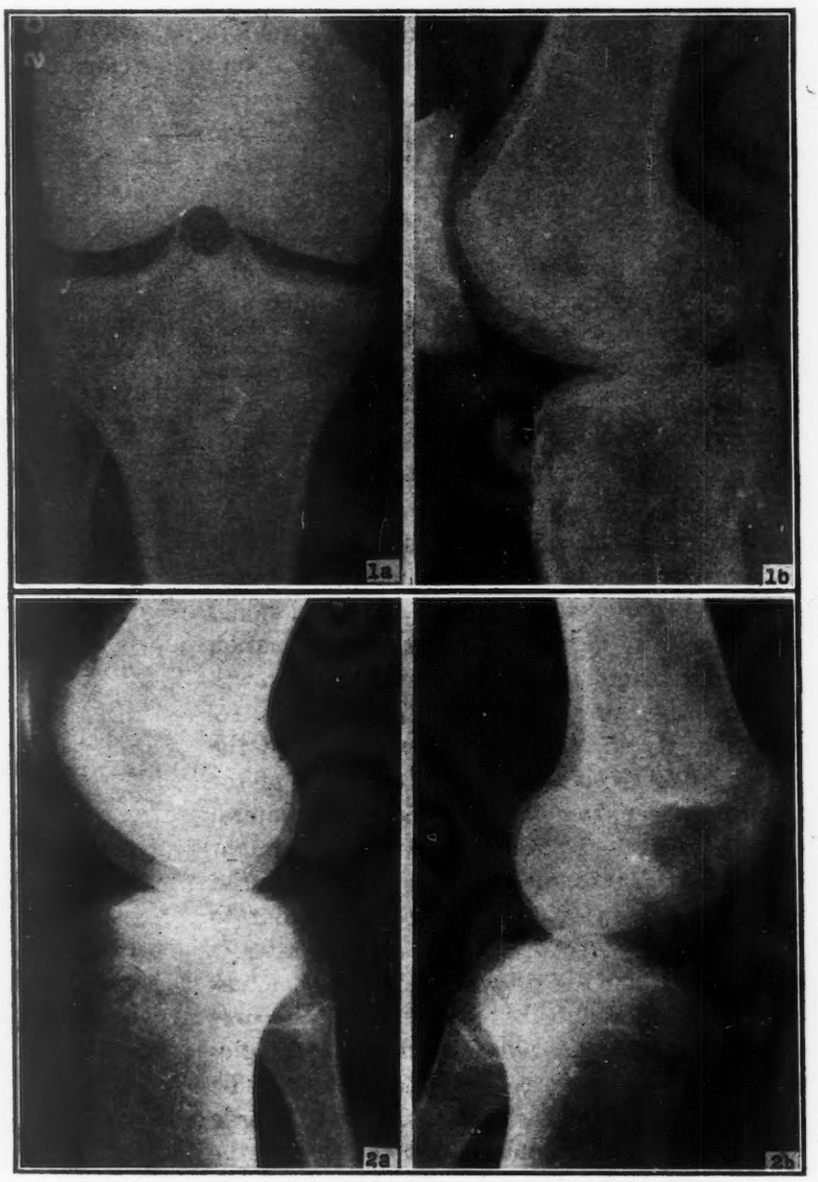
The term Osgood-Schlatter disease has appeared in the literature since the publication of papers by Osgood[1] in 1903 and independently by Schlatter[2] in 1908. These authors described what they thought was an epiphysitis of the tibial tubercle. According to Boyd[3] it is more properly termed an osteo-chondritis and the term osteo-chondritis has been used by Christopher.[4] Watson-Jones[5] objects to its being called a "disease", pointing out that it is a localized reaction to trauma. He draws attention to similar conditions such as the traumatic separation and non-fusion of the tubercle epiphysis of the os calcis by gastrocnemius stress, and of the internal epicondyle epiphysis of the humerus by flexor muscle stress.

DEVELOPMENTAL ANATOMY OF THE TIBIAL TUBERCLE

A review of the development of the tibial tubercle is helpful in understanding this pathological condition.

The tibial head epiphysis usually develops from one ossific centre which appears just prior to or shortly after birth and fuses completely with the diaphysis about the 21st year. It is round at first, gradually becomes oval and later nodular in outline. In the final adult shape the tibial spine and tuberosities are developed. Between the ages of 5 and 10 years, a downward projecting lingula from the front of this epiphysis occurs, which is to form the tibial tubercle. In a small percentage of individuals the tibial tubercle may develop as a separate ossific centre. In its development the tibial tubercle can assume considerable variations in size and shape, and may occasionally develop from multiple centres. When it develops as a separate centre or centres, it normally fuses with the main upper tibial epiphysis between the ages of 16 and 18 years.

Properly speaking, there is a division of labour between the tibial head epiphysis and its lingula (or



Six typical and well-established cases of the group, showing variable combinations of the described radiological features.

Fig. 1.—Antero-posterior and lateral of typical case complicated by hypertrophic changes in the patella. Note osteomatous formation, loose fragment and calcific deposit in patellar ligament. **Fig. 2.**—Comparative lateral projection with the normal knee. Tubercle bed shows sclerosis and superimposed recent inflammatory reaction presumably to recent strain.

as the case may be, the separate tubercle epiphyseal centre). In the first instance it is primarily a pressure epiphysis to protect the growing end of the bone, whereas the tubercle epiphysis is essentially a traction epiphysis for the attachment of the patellar ligament.

The next important anatomical fact having a structural bearing on this condition is that the tubercle forms only the central apical portion of the patellar ligament insertion. The patellar ligament also has lateralized insertions over the anterior aspect of the tibial tuberosities. The functional arrangement is such that this apical tubercle portion of the insertion takes the initial shock of quadriceps stress. The lateral insertions serve to diffuse and minimize the effects of severe extensor strain which would tend to avulse the tubercle. The tubercle itself, however, is the part exposed to the repeated physiological stresses of quadriceps pull in walking.

RADIOLOGICAL CONSIDERATIONS IN THE DIAGNOSIS OF RECURRENT OSGOOD-SCHLATTER STRAIN

Good radiographic technique is essential for accuracy in interpretation. It is recommended that every examination of "the knee" should include the tibial tubercle area and that the opposite or "normal" knee be taken for comparison purposes. The lateral projection gives the most information, the tubercle area being viewed in profile. The age of the patient is an important item on the clinical information submitted on the requisition form. The age gives us the information as to what to expect in the stage of development and fusion of the tubercle epiphysis. A non-fused epiphysis after the age of 21 years is the first suspicious observation of abnormality and especially so if the "normal knee" shows complete fusion. The presence of several ossific centres more or less in the line of the ligamentum patellæ towards its insertion in a boy of 18 years or younger does not necessarily mean "fragmentation" of the epiphysis, but can be a normal anomaly of development as pointed out above.

The following radiological features have been observed in these 14 cases referred with positive clinical findings:

1. Tubercle epiphyseal fragments or centres unfused after the age of 21 years. (The opposite "normal" is fused by comparison).

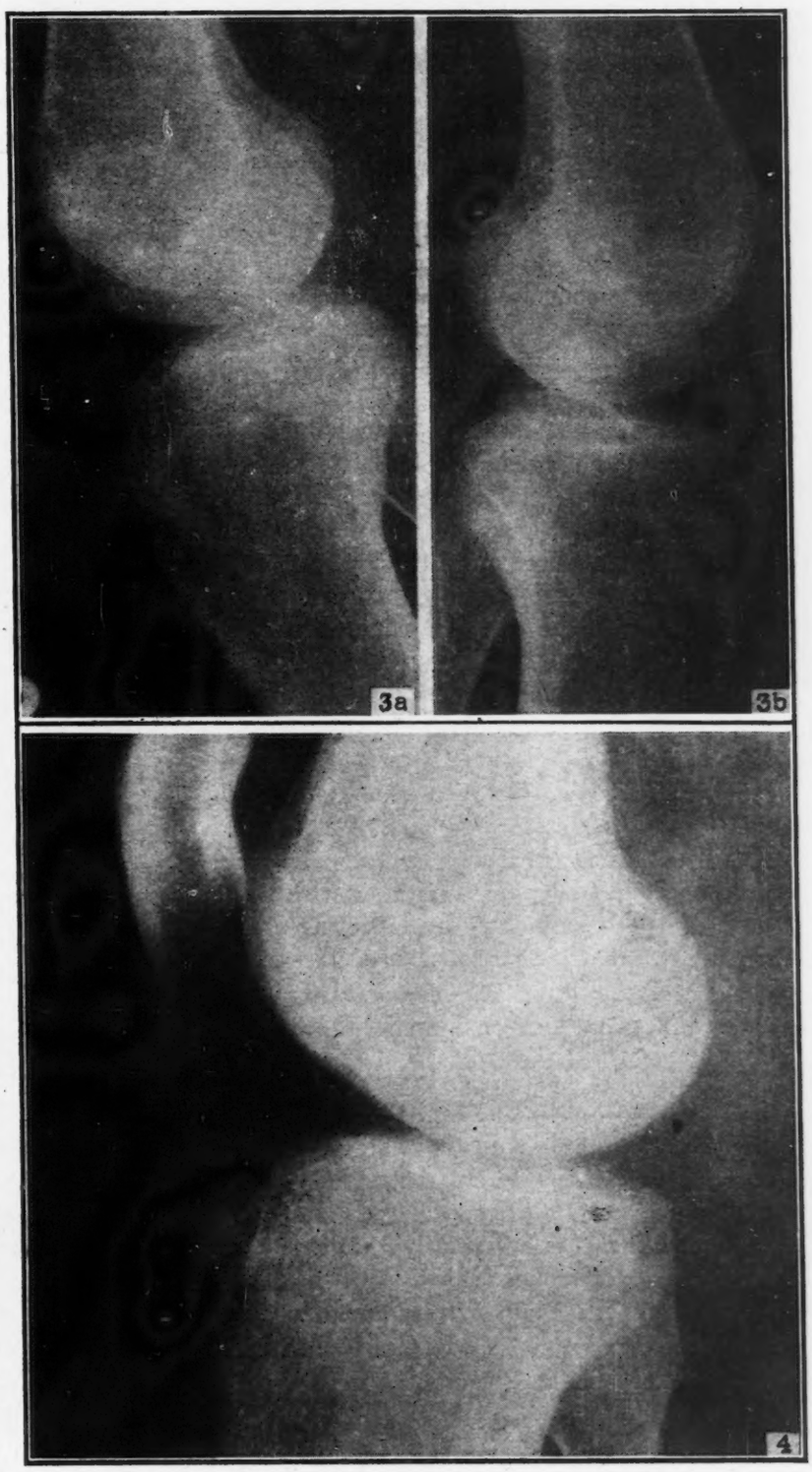


Fig. 3.—Comparative lateral projection with the normal knee. Note curled osteomatous formation and multiple fragmentation of unfused tubercle. The overlying soft tissue "bump" is well shown. **Fig. 4.**—A close view of a typical case. The osteomatous formation tends to deepen the bed for the fragmented tubercle as it piles up around it.

2. Unfused fragments may be (*a*) irregular in contour; (*b*) heavily sclerosed, giving an amorphous appearance to their structure; or (*c*) relatively osteoporotic, depending on the phase of activity (hyperæmic decalcification).

3. A large major fragment with straight edges and sharp geometric corners may be observed to be elevated several millimetres from a similarly shaped excavation in the tubercle bed.

4. Fibrous bands made visible by dense scarring and often containing calcium deposit are frequently seen joining the loose bodies to each other and the tubercle bed.

5. Irregular amorphous calcium deposit about the tubercle bed from calcifying hæmatoma.

6. Osteomatous projections of the tubercle bed, presumably due to traction strain on accumulating soft osteoid tissue incident to attempting repair in the area.

The first sign is a common denominator in all cases. Any combination of these signs with the first indicates recurrent traumatizing strain to tubercle area, rendering the epiphyseal centre permanently non-fused and unstable. It would appear that the radiological picture is sufficiently characteristic to pass a definite diagnosis which will explain to the orthopædic surgeon the underlying pathological condition. We have collected the following array of terms from M.F.B. 1478's "Specialists' Reports": Osgood-Schlatter's disease (or syndrome); Osgood-Schlatter strain; osteochondritis of the tibial tubercle epiphysis; avulsion un-united fracture of the tibial tubercle, etc. Without wishing to complicate the terminology by initiating a new one, it is felt that the modified term "recurrent Osgood-Schlatter strain" is descriptive, informative and gives historical credit to the men who first described the entity.

ETIOLOGICAL CONSIDERATIONS

Since the beginning of the war, special interest has been directed toward the study of the variable effects of physiological wear and tear. Large numbers of apparently healthy men undergoing severe physiological stress of training offer an excellent opportunity for such study.

The knee is a vulnerable focal spot for traumata of two varieties:

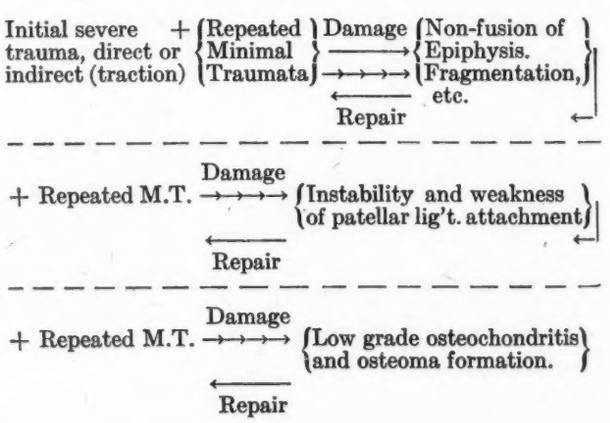
1. Direct violence of all kinds due to its exposed position in locomotor activity and kneeling.

2. Indirect violence due to muscle pull; the quadriceps, being one of the most powerful muscles in the body, can exert severe stress on its ligamentous insertions, especially when counter-balancing gravitational flexion stress as in landing on the feet from a high jump with the knees partially flexed.

A history analysis in this series of cases indicates the onset of symptoms and signs during adolescence, very often between the ages of 14 and 17 years, when the school boy is most active in the strenuous games of hockey, football, lacrosse and baseball. The individual can usually remember a specific incident from which his knee disability dates. At this age the unfused tibial tubercle lingula (or epiphyseal centre) is relatively susceptible to injury. In most cases the history will reveal that the initial trauma while causing considerable discomfort did not totally incapacitate the individual, but that the affected knee was very slow to improve. During the intervening years up to his present experience in the army, the subject has noted a tender lump below the knee cap. He has learned that strenuous leg exertion causes considerable aching discomfort which lasts for several days and is usually worse at night. He will have learned to favour the affected leg by avoiding participation in strenuous sports and long walks. A typical expression is that "it slows me up". Long route marches, "doubling" and P.T. bother the man in training.

The pathological picture has been described[3] as a low-grade aseptic osteochondritis of the tibial tubercle area. The radiologist can interpret the pathological changes in comprehensive terms as described above. Taking into consideration the history background of a typical case and the development anatomy of the area, this pathological entity can be explained as a natural mechanical sequence of events.

A diagrammatic concept of the stages is as follows:



Following the initial injury to the tubercle epiphysis, failure to completely immobilize the damaged part (or to immobilize it long enough to allow of healing) results in an unequal battle between the natural reparative tendency and the continuing damage done by the repeated minimal trauma of physiological locomotor activity. The physiological stress tolerance of the damaged tissue is lowered so that stresses which under conditions of health are not injurious now lead to accumulating damage and persistent irritation. The repair process never equalizes or catches up with the destructive process, so that under these circumstances the lesion is self-perpetuating. It is this inflammatory and proliferative response to repeated minimal trauma which has led pathologists to call the condition osteochondritis. It is pointed out that there is nothing about the lesion to suggest infection. Recurrent exacerbations of symptoms can be expected following trivial injuries or strenuous leg exercise.

CONCLUSION

There is a marked disparity of opinion on the diagnosis and disposal of this important knee disability. It is felt that this is due in part at least to:

1. Inadequate pre- and post-enlistment history analysis.

2. Failure of agreement on the mode of development and pathological nature of this clinical entity.

In such a condition the onus of responsibility for accuracy of description and diagnosis falls heavily on the radiologist. Recurrent Osgood-Schlatter strain has a higher incidence than is generally realized. It is felt from these observations that the condition has been underestimated as a potential or actual knee disability.

A better understanding of the actual mechanics and pathology of this lesion should help in working out a more uniform and effective treatment and disposal of such cases.

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PENICILLIN IN HÆMOLYTIC STREPTOCOCCAL INFECTIONS OF THE THROAT

By Surgeon Lieut.-Cmdr. J. D. Keith, Dr. E. T. Bynoe,* Surgeon Lieut.-Cmdr. J. Maclennan, Surgeon Lieut. J. Williamson, Lieut. (S.B.) J. Carpenter and Surgeon Lieut. C. Armstrong†

Royal Canadian Navy

ALTHOUGH streptococcal infections of the throat are numerous and widespread in Canada, it has not been possible to treat them with penicillin until recently because of the shortage of supply. Sulfonamides proved of some value in treating acute tonsillitis, but the effect was rather to reduce the incidence of complications than to lessen the duration or severity of the illness. Furthermore, chemotherapy did not appear to eliminate the organisms from the throat and the spread of the disease was not inhibited. In the past year the appearance of sulfonamide-resistant strain of streptococci in the United States has introduced many new problems in streptococcol epidemiology, and partially nullified the value of sulfonamides in the treatment and prevention of streptococcal infections.

At the present time it is, therefore, particularly important to know what effect penicillin has on the pathogenic strains of the streptococcus both from the therapeutic and prophylactic point of view. Plummer[1] and co-workers in the U.S. Army Medical Corps studied a group of 45 cases recently and found penicillin brought symptomatic relief earlier than would otherwise be expected and that the organisms rapidly disappeared from the throat in the vast majority of cases.

The present investigation was begun in November, 1944, and completed in June, 1945. During the winter of 1943-44 a large epidemic of streptococcal infections prevailed at *H.M.C.S. Cornwallis*, precipitating many cases of scarlet fever, sore throat, and rheumatic fever. We, therefore, expected a liberal number of streptococcal infections to occur again this year.

* Department of Health and National Welfare, Ottawa.

† The following Medical Officers in rotation also collected clinical data on the wards: Surgeon Lieutenants G. Miller, A. Bryant and B. Hill.

However, there was no large epidemic and streptococcal infections appeared only in endemic proportions.

There were a number of factors involved in this marked reduction. A program of control had been introduced and contributed along with natural yearly variations in preventing the spread of infections.

METHOD OF STUDY

It was decided to include in the investigation all those cases admitted with acute pharyngitis that had hæmolytic streptococci (Group A) in their throats. At the same time, the immune response in the blood stream was studied by doing antistreptolysin titres at the onset of the infection and after one month. Since a definite rise in titre is accepted as evidence of a streptococcal infection, we then had a group of cases in which the diagnosis allowed little doubt. Penicillin was administered by the intramuscular route, 20,000 units every four hours, 6 times daily, until 360,000 units had been injected. This therapy was given to every other case and the alternate ones kept as controls and simply treated symptomatically.

In treated patients, whose throat cultures showed streptococci when the penicillin course was completed, or at the end of a week, another course of 360,000 units of penicillin was given.

LABORATORY DATA

The following procedures were carried out on all patients admitted with acute nasopharyngitis as soon as possible after admission: (1) 2 throat swabs an hour or two apart; (2) a white blood count; (3) blood specimen for antistreptolysin titre and sedimentation rate; (4) a clinical record sheet started for recording signs and symptoms from time of onset of disease up to discharge from hospital.

In the treated groups, penicillin was started as soon as it was known that the patient had hæmolytic streptococci in the throat. This was sometimes the first day in hospital but in the vast majority it was necessary to wait until the second day before therapy was begun. Since the average length of illness of each case before admission was two days, this meant that treatment was usually begun on the third or fourth day of disease.

The white blood count was repeated on the third day in hospital and twice a week thereafter until discharge, or until two normal counts were obtained. A throat swab was taken on the day after the penicillin course was completed. This was usually on the 5th day after admission. Similar swabs were taken in the controls. Two throat swabs and a West swab of the nasopharynx were taken a few hours apart at the end of one week in hospital. Those that remained in longer had two throat swabs taken once a week thereafter. The sedimentation rate was done once a week.

A month after the time of admission the patient returned for two throat swabs and a West swab, and at that time blood was drawn for antistreptolysin titre. The original hæmolytic streptococcus obtained in each case was planted on Robertson's meat mash and forwarded to the Department of Health and National Welfare in Ottawa for typing. If one of these organisms was found after the month interval it was sent up for typing to see if the original streptococcus persisted.

The antistreptolysin determinations were carried out by the method of Hodge and Swift.[2] Criterion for a significant rise in titre was taken as 2 tubes, as assessed in the publication by Mote and Jones.[3] In all 111 nasopharyngeal (West) swabs were taken. In only two cases were these found to be positive when the pharyngeal swabs were negative. For this reason, it was not considered a useful adjunct to throat swabbing.

Over 1,500 throat swabs were taken altogether; 544 pairs were taken with an hour or two interval between the two swabs. Of this number 48 instances of disagreement occurred; that is, one swab positive and the other negative. Since we were particularly interested in determining whether any organisms persisted after treatment, the taking of two swabs helped materially in achieving this end.

Every effort was made to employ uniform technique in taking and planting of throat swabs, with a minimum of time between taking and planting. The swabs were immediately streaked on blood agar and the following morning the hæmolytic streptococci present were picked off and incubated in broth for Lancefield grouping. Whenever hæmolytic streptococci are referred to in the results that follow they have been proved to be Group "A". The hæmolytic streptococci were reported in four categories, according to growth: (1) few; (2) moderate; (3) many; (4) heavy.

There were 89 cases in the study from *H.M.C.S. Cornwallis,* and 46 from *H.M.C.S. Stadacona.* The method of investigation and plan of treatment was the same in both groups. The same general type organisms were found. There were more cases at *Stadacona* that had a rise in antistreptolysin titre, suggesting that patients with slightly more severe attacks were admitted to hospital.

Towards the end of the investigation, a small group of 20 patients was treated with oral penicillin. The method used was that of administering the penicillin in egg after the publication of Little and Lumb.[4] They used 15,000 units per dose and we raised this to 30,000 units and gave it every three hours, 6 doses in a day for 6 days. The results in these 20 cases are shown separately.

RESULTS

SUMMARY OF GROUPS STUDIED

1. Patients treated with penicillin intramuscularly	59
2. Patients treated symptomatically	56
3. Patients treated with penicillin orally	20
Total	135

Of 59 cases in Group 1 40 had antistreptolysin titre done; 23 (57%) had a significant rise in antistreptolysin in convalescence.

Of 56 cases in Group 2 47 had antistreptolysin titre done; 27 (57%) had a significant rise in antistreptolysin in convalescence.

Our criteria for selection of cases was simply the presence of an upper respiratory infection with a positive throat culture. It is realized that this does not mean that all were due to the streptococcus. Dingle[6] and co-workers reported a study last year on this diagnostic problem and found that only half of their cases with hæmolytic streptococci in their throats had a rise in antistreptolysin antibodies. A similar study of immunity reaction permitted us to divide our cases into two groups, those that had an appreciable rise in antistreptolysin titre (2 tube) and those that had no appreciable increase. It is not, of course, possible to say that all those infections that had no rise were not initiated by the streptococcus, but we are able to say with a high degree of certainty that those that did have a definite rise were suffering from hæmolytic streptococcus infection.

In evaluating the effect of this therapy on signs and symptoms we have compared only those that had this distinct rise in antistreptolysin titre. The results are set down in Chart 1.

It will be seen that the penicillin therapy shortened the time that the temperature was elevated from approximately five days, to three days. This is the most definite finding because less sources of error enter into the interpretation than the other signs chosen for comparison.

The exudate and redness cleared in approximately the same interval in both groups. However, the cervical glands remained enlarged longer in those that did not receive penicillin. The days in hospital were less in the treated cases. The clinical impression was that penicillin shortened the course and severity of the disease in many cases, particularly those that were admitted on the first day of disease.

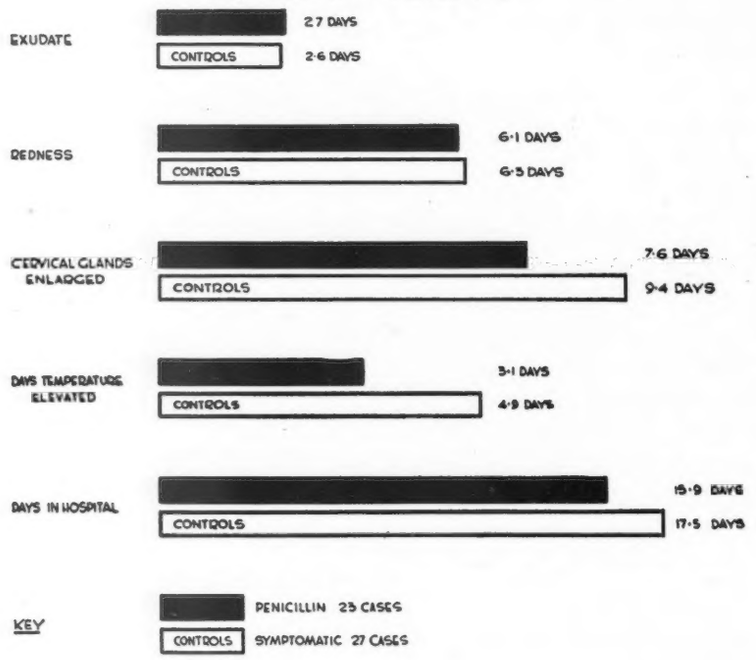
Of 59 cases treated with penicillin, 20 continued to harbour hæmolytic streptococci in their throats at the end of one week. Of these 20 patients 11 had developed an exacerbation after the three-day course of penicillin had been completed. They all then received a second course of penicillin and the symptoms subsided. When we became aware of these cases we were impressed with the necessity of administering penicillin for six days instead of three in a considerable number of patients because of a return of some sign or symptom (18% of the penicillin group). There were 39 patients treated with penicillin who had no hæmolytic streptococci after one week. Only four of these were found to have some slight recurrence of fever after their three-day course of penicillin had been completed. We concluded that a recurrence of temperature rise after the penicillin therapy is usually associated with the continued presence or a return of streptococcal organisms.

Certain complications appeared, such as otitis media, peritonsillar abscess and sinus infection, in equal frequency in each group. In the treated group peritonsillar abscesses subsided more rapidly with less resort to surgery than in the symptomatic group, but there were not enough instances to draw definite conclusions. What complications we had an opportunity to treat responded well to the penicillin.

Effect of penicillin throat cultures.—The most spectacular effect of penicillin was on the throat cultures. In Chart 2 it will be seen that one week after admission in those treated with penicillin intramuscularly, a third of the patients continued to have hæmolytic streptococci in their throats. These cases were given a second course and at the end of a month only six con-

CHART Nº I

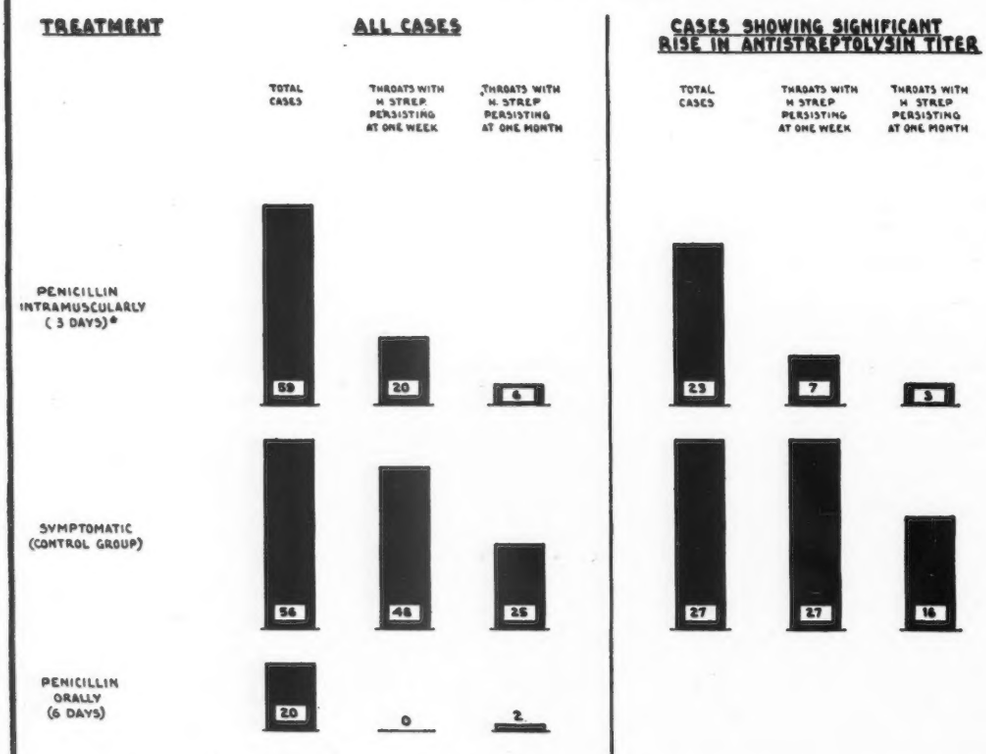
AVERAGE DURATION OF SIGNS AND SYMPTONS



EFFECT OF PENICILLIN THERAPY IN PATIENTS WITH SORE THROATS OF PROVEN STREPTOCOCCAL ORIGIN

(THAT IS, WITH A SIGNIFICANT RISE IN ANTISTREPTOLYSIN TITER)

CHART Nº II



EFFECT OF PENICILLIN IN CLEARING SORE THROATS OF HAEMOLYTIC STREPTOCOCCI

*(3 DAY COURSE REPEATED IF ORGANISMS PERSISTED AT ONE WEEK)

tinued to harbour the organisms. In the control cases, on the other hand, the majority had organisms in their throat at one week, and approximately half of them still had them after one month.

This effect is more striking when only those that have been proved hæmolytic streptococcal infections are considered, that is, the ones that had a significant rise in their antistreptolysin titre. Here the proportion of throats cleared by penicillin was about the same as in the overall group, but in the symptomatic (control) group none of the patients had cleared by one week, and 60% continued to carry some streptococci after one month.

This suggests that hæmolytic streptococci are cleared up by penicillin in the same proportion, whether they are the causative agent or not. However, when the treatment is symptomatic the hæmolytic streptococci which have caused disease in the throat linger longer than those that have come there incidentally or those appearing in infections that do not produce appreciable antibody reaction.

ORAL PENICILLIN

It is evident that in ordinary use it is impractical to administer penicillin intramuscularly, since with few exceptions patients with sore throats are treated at home. For that reason, it was decided to treat a small group by one of the various methods of administering penicillin by mouth. The procedure of Little and Lumb of mixing the penicillin with egg was chosen and each dose was preceded by 2 drachms of magnesium trisilicate; 30,000 units were given every 3 hours 6 times a day. The work of Heatley[5] following that of Little and Lumb[4] showed that while the blood level was not as high as previously reported, in a number of cases, the blood level was appreciably higher than if the penicillin was given alone without the egg. Blood levels were not done in our study, but throat cultures taken daily, indicated without exception that the organisms disappeared from the throat within 48 hours of starting therapy. Since it was evident from our intramuscular studies that 3 days was too short a time to maintain clearance of the streptococci, it was decided to give the drug for 6 days. The effect on the disappearance of signs and symptoms appeared to be as effective as by parenteral administration, although the group was not large enough for statistical purposes. The effect on ridding the throat of streptococci was just as dramatic; in fact, as mentioned above, the throat cultures all became negative in the first 48 hours of treatment. Whether this was due partially to the fact that the penicillin came in contact with the diseased membranes, or whether the blood level was the effective avenue of approach, is difficult to say. A few preliminary cases treated with penicillin pastilles did not respond nearly as satisfactorily. The results of penicillin on the throat cultures are shown in Chart 2.

Serological typing. — Serological typing was done in 84 cases. The types found are set down in Table I. It will be noted that Types 2, 12 and 14 were more frequently found than the others but none reached epidemic proportions.

TABLE I.

SEROLOGICAL TYPES OF GROUP A HÆMOLYTIC STREPTOCOCCI ISOLATED FROM 84 PATIENTS WITH ACUTE PHARYNGITIS

Type	*No. of cases*
2	19
3	2
4	2
5	1
6	7
11	8
12	12
13	3
14	15
17	1
19	6
24	1
25	1
27	3
29	1
32	1

Cases that continued to harbour hæmolytic streptococci at the end of one month are listed with types found in Table II. Two cases of Type 14 and 2 of Type 12 occurred in the group treated with penicillin. In spite of the fact that there were 19 cases of Type 2 originally none persisted in the penicillin group leaving the

TABLE II.

SEROLOGICAL TYPES OF HÆMOLYTIC STREPTOCOCCI PERSISTING IN THROATS AFTER ONE MONTH

Treated with penicillin		*Treated symptomatically*	
Type	*No. of cases*	*Type*	*No. of cases*
12	2	2	8
14	2	3	1
		5	1
		6	1
		11	3
		12	2
		13	2
		14	3
		19	2
		24	1
		29	1

impression that Types 12 and 14 were a little less sensitive to penicillin than Type 2.

An effort was made to repeat the typing in the cases that continued to harbour streptococci in their throats after one month. It was not always possible to do this but out of the 25 cases in the symptomatic group that continued to show positive cultures, 17 were re-typed: 14 of them showed the same type as found originally and 3 were different types. These 3 cases were then considered to be eligible for the cleared group. Among those treated with penicillin which persisted 3 cases were re-typed and each had the same type of organisms as found originally.

COMMENT

It has not been realized until recently how extremely difficult it is to make a diagnosis of a streptococcal throat infection.

If clinical appearance is relied on alone the majority of cases will be incorrectly labelled. Dingle[6] and co-workers on the commission on acute respiratory diseases showed that only a quarter of pharyngitis patients with exudate in their throats had a significant rise in antibodies. If throat cultures are taken as the chief criterion, the mere presence of hæmolytic streptococci in a patient with tonsillitis will lead to an incorrect diagnosis in about half of cases. If only those with a heavy growth of Group A hæmolytic streptococci are taken possibly three-quarters will be correctly labelled. However, in the presence of an epidemic of scarlet fever and sore throats, the chances of making a correct diagnosis on clinical grounds alone are much greater.

If the antistreptolysin titres estimated at the time of the infection and a month later, show a "2 tube" rise, the work of Jones[3] and others[8] leaves little doubt that one is dealing with a hæmolytic streptococcal infection. While this is true, the converse is not proved so. That is, if no rise occurs one cannot say definitely that a hæmolytic streptococcal infection has not occurred. In scarlet fever, only 78%[3] of uncomplicated cases show a rise and it is entirely possible that mild cases of sore throat due to hæmolytic streptococci will produce no increase in antistreptolysin titre.

However, for our present purpose we wanted mainly to have a group of cases of pharyngitis that we knew with little doubt were due to hæmolytic streptococci and we are satisfied that this was achieved by the antistreptolysin estimation. It is interesting to note that the use of penicillin did not inhibit the development of this antibody. The percentage with a rise in titre was the same in both treated and control groups.

Penicillin unquestionably brought the temperature to normal sooner than when no specific therapy was administered. It also reduced the swelling of cervical glands more rapidly. There were not sufficient instances of peritonsillar abscess for statistical purposes but in several cases under penicillin therapy, the protruding tonsil appeared to subside much more rapidly and surgery was avoided more frequently than when no penicillin was given.

Many patients were delayed in hospital for various reasons and the length of time in hospital does not serve as a reliable method of estimating the effect of therapy in this study.

Chart 2 shows the number who were cleared of the hæmolytic streptococci after one week in hospital. Not shown in this chart is some additional data regarding the throat swab taken just after the 3-day course of penicillin had been completed. Forty-nine of the 59 cases treated by intramuscular penicillin for 3 days had no hæmolytic streptococci in their throats the day after therapy was stopped. Three or four days later (that is after one week in hospital) 10 of the 49 were found to have the hæmolytic streptococci re-appearing in their throat cultures. This bacteriological relapse was frequently accompanied by a clinical relapse (55%).

On repeating the course of penicillin in the patients who harboured the organisms at the end of one week in hospital most of the cases ceased to be carriers. Thus it appeared necessary to give intramuscular penicillin for six days to clear 90% of the cases. The prime importance of giving penicillin for 6 days was illustrated in two ways. Firstly, by the number of cases which showed a recurrence of fever one or two days after the initial penicillin therapy had ceased. Secondly, it was noted that one-third of the cases continued to contain hæmolytic streptococci in their throats after the 3-day course of penicillin was completed and an interval of 3 or 4 days had elapsed. From the experience with our group the impression is gained that if the 10% remaining carriers after 6 days' treatment were available for further penicillin therapy, they too could be relieved of the hæmolytic streptococci. This was done in a few in-

stances when they returned for their one month's throat culture. It also seems clearly possible that larger doses given at more frequent intervals may completely clear up all the cases in six days.

It is obvious that only under the unusual circumstances of service conditions can one treat sore throats in hospital for the necessary period, and by repeated intramuscular injections. From the practical point of view, it is necessary to have a satisfactory method of treating these cases by penicillin given orally. It was for that reason that a small group was tried on 180,000 units a day for 6 days by the oral route. The method of Little and Lumb[4] which appeared in the literature last winter seemed simple and effective and was, therefore, tried. We have not checked our therapy with blood estimations but satisfactory results in throat cultures suggests an effective blood level. There may have been an effect locally as the penicillin in egg solution was swallowed but the similarity of the results to the intramuscular cases and the lack of permanent satisfactory findings using penicillin pastilles in a few cases here and in the literature[9] suggests that at least some of the penicillin was reaching the infected area via the blood stream.

Several methods of giving penicillin orally have appeared in the literature recently. That of Welch *et al.*[7] of giving penicillin in amphogel achieved blood levels that have been satisfactorily effective against hæmolytic streptococci. This should permit the use of penicillin in treating office and home patients that have hitherto not benefited by the drug.

There is no doubt we now have a tool for clearing up hæmolytic streptococci throat infections and carriers that is much more effective than any method known to date. Since a large portion of days spent in hospital by service men is due to the streptococcus, it would be well worth while to attempt to eliminate these organisms from post infection carriers, particularly in new entry training areas where epidemics are arising. Scarlet fever cases without complications could in most cases be released from isolation at the end of one week.

Experience with sulfonamides showed that sulfa resistant strains of hæmolytic streptococci can develop readily which will resist prophylactic doses of that drug and in many cases remain resistant to therapeutic doses. It is, of course, important that this should not occur once more with penicillin. Resistant organisms can be produced *in vitro* by using a sublethal dose of penicillin repeatedly until only the hardiest organisms remain. From these experiments, it appears necessary to use an overwhelming dose always in treatment. This should be possible in the majority of cases. For this reason, more work is required with suitable blood levels of penicillin before proper doses are arrived at for the various sensitive bacteria.

It is hoped eventually that carriers of virulent streptococci everywhere may be identified and rid of their organisms. If this can be applied in a widespread fashion to schools, service establishments, hospitals, etc., a great deal of sickness may be prevented. It may be noted here that two of our cases developed rheumatic fever while on penicillin therapy. They showed signs of this complication in the third day in each case. Both cases ran the usual course but neither developed any sign of heart disease. None of the control group developed rheumatic fever.

SUMMARY

One hundred and thirty-five patients with acute pharyngitis and tonsillitis who had hæmolytic streptococci Group A in their throats were studied clinically and bacteriologically.

Fifty-nine were treated with 360,000 units of penicillin intramuscularly over a three-day period. In those who were not made rid of their hæmolytic streptococci this course was repeated. Fifty-six were treated symptomatically. Twenty were treated with penicillin orally.

The average length of time the temperature remained elevated after admission in the penicillin treated group was 3.1 days. In the symptomatically treated control group it was 4.9 days.

Penicillin also had a marked effect on the existence of hæmolytic streptococci in the throat. Taking the cases that had a proved streptococcal infection, in the penicillin-treated group 30% continued to harbour hæmolytic streptococci at 1 week and 13% at one month. In the symptomatically treated controls 100% continued to harbour these organisms at one week and 60% at one month.

It required six days' therapy to treat adequately the sore throats due to hæmolytic streptococci and be sure of no recurrences. It also required six days' therapy to rid the throat of the offending organisms and prevent their return in the majority of cases.

Penicillin adminstered orally in adequate quantities by the technique of Little and Lumb was effective therapeutically and also in ridding the throat of hæmolytic streptococci. Improved oral penicillin preparations make this approach eminently feasible.

Many channels of therapy and prophylaxis are opened up by the use of penicillin in hæmolytic streptococcal infections. It may well be possible with adequate penicillin therapy to reduce the isolation period of uncomplicated scarlet fever to one week.

The authors wish to express their appreciation to Nursing Sister (S.B.) Mona Martyn who gave valuable assistance in collecting the bacteriological data.

The interest, supervision and advice of Surgeon Commander Hugh Starkey and Surgeon Commander Alan Ross were an essential part of the study.

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SURVEY OF NON-EFFECTIVE MEDICAL REBOARDS, CANADIAN ARMY OVERSEAS, JULY TO DECEMBER, 1944

By Major D. G. H. MacDonald and Lieut. I. L. Wellwood
R.C.A.M.C.

THIS survey is a study of all personnel medically reboarded to a non-effective level (in army terminology 5 in the pulhems profile) for return to Canada from the Canadian Army Overseas during the six month period July 1 to December 31, 1944. This period was one of considerable activity for the army, and hence is suitable for showing in the proper perspective the various types of wastage suffered by an army.

This study indicates the effectiveness of the medical screening prior to embarkation for overseas duty, the disabling conditions which develop under conditions of service, the success of the Medical Corps in preventing complete wastage and the non-effective rate for the overseas army. This survey has also been extended to study the general over-all effect of age on medical non-effectiveness and its relation to certain disease conditions.

ANALYSIS OF MEDICAL REPATRIATION BY DISEASE AND INJURY

In Table I is shown an analysis of the various causes and conditions which resulted in return to Canada. For each case only the condition which resulted in the awarding of grade 5 was noted. If more than one condition contributed to the 5 grading a selection as to the most disabling was made. This selection was chiefly a problem in multiplicity of wounds the result of enemy action. The following order of importance in selection of the injury in multiple wounds was used: eyes, head, abdomen, chest, extremities. The net result of this is that only one disability is counted for each patient, so that while some conditions are lost to the survey, the proportion in the three main causative classes (wounds the result of enemy action, accidents and disease) is correct.

The following observations might be made on Table I.

(*a*) Of the 8,593 personnel boarded to a non-effective level 58.8% were for wounds the result of enemy action, 8.5% for injuries the result of accidents and 32.7% were non-traumatic medical repatriations.

(*b*) Wounds of the extremities, unaccompanied by disabling wounds of the head or trunk accounted for 71.7% of the wounded repatriations.

(*c*) Seventy-eight per cent of the accident group were fractures.

(*d*) Diseases of the nervous system (exclusive of eye and ear) accounted for 39.2% of the non-traumatic repatriations.

(*e*) The two most frequent disease entities were psychopathic personality and psychoneurosis.

(*f*) Peptic ulcer was the most common non-psychiatric disability.

(*g*) Herniated intervertebral disc was the most important single condition in the group "Diseases of the bones and organs of locomotion".

Analysis of Non-Traumatic Medical Repatriations by 5-Year Age Groups

In Table II accompanying this section important diseases in the various 5-year age groups are shown as percentages of the total in each group. This analysis refers not to the relative risk of succumbing to a given disease at a given

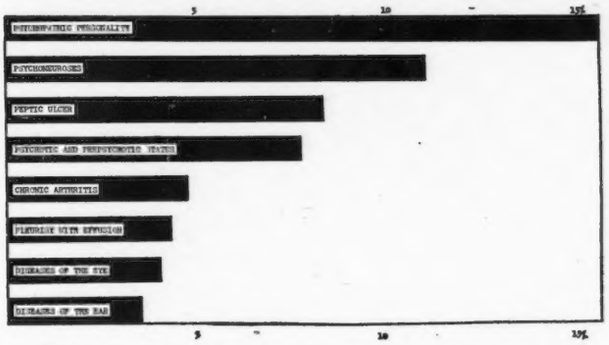

Fig. 1.—The eight most frequent non-traumatic conditions resulting in non-effective status shown as percentage of total of all non-traumatic conditions.

Table I.

Analysis of Medical Repatriates by Cause and by Condition

Total number boarded to a non-effective level 8,593

		% of all "5" Reboards
Caused by:		
Enemy action	5,055	58.8
Accidents	728	8.5
Disease	2,810	32.7
	8,593	100.0

Analysis of These Three Groups

Wounds—(The result of enemy action)

Wounds—(The result of enemy action).	*Cases*	*% of "5" Reboards (Enemy action)*
Extremities	3,626	71.7
Head and neck	499	9.9
Abdomen	386	7.7
Loss of vision—complete or partial one eye	329	6.5
Chest	194	3.8
Loss of vision—complete or partial both eyes	21	0.4
	5,055	100.0

Accidents	*Cases*	*% of "5" Reboards (Accidents)*
Amputations and fractures of lower extremities	373	51.3
Amputations and fractures of upper extremities	98	13.5
Other injuries	88	12.1
Loss of vision—complete or partial	66	9.1
Fractures of face and skull	54	7.4
Fractures of spine and pelvis	49	6.6
	728	100.0

Disease—(Analysis of the important classes)

Diseases of the Nervous System:	*Cases*		*% of "5" Reboards (Disease)*
Psychopathic personality	437		
Psychoneuroses	310		
Psychotic and prepsychotic states	217		
Other of this class	55		
Post diphtheritic neuritis	24		
Neurosyphilis	21		
Idiopathic epilepsy	19		
Mental retardation	18		
		1,101	39.2
Diseases of the eye		113	4.0
Diseases of the ear		101	3.6
Diseases of the Respiratory System:			
Pleurisy with effusion	122		
Bronchitis—chronic and relapsing	78		
Asthma and asthmatic bronchitis	54		
Sinus	36		
Others of this class	24		
		314	11.2
Diseases of the Digestive System:			
Duodenal ulcer	181		
Gastric ulcer	51		
Others of this class	38		
Hernia	17		
Diseases of the gall bladder	9		
		296	10.5
Rheumatic Disease, Disease of Nutrition, Endocrine Glands and other General Diseases:			
Chronic arthritis (all types)	131		
Non-articular rheumatism	27		
Diabetes	18		
Others of this class	7		
		183	6.5
Diseases of the Locomotor System:			
Others in this class	62		
Herniated intervertebral disc	61		
Internal derangement of the knee	12		
Flat feet	4		
Other deformities—feet	4		
		143	5.1
Infectious and Parasitic Diseases:			
Tuberculosis—pulmonary	91		
Tuberculosis—other types	17		
Others of this class	18		
		126	4.5
Diseases of the Circulatory System:			
Hypertension	37		
Heart disease—other types	31		
Others of the circulation.	27		
Rheumatic heart disease (acute and chronic including rheumatic fever)	20		
Varicose veins	12		
		127	4.5
All other classes		306	10.9
		2,810	100.0

age, but to the relative contribution of a given disease to the total of diseases in successive age groups. Psychopathic personality heads these groups to the age of 29, to be replaced by psychoneurosis to the age of 39, when this condition is superseded by arthritis. In each age group at least two of the leading three conditions are psychiatric. Of non-psychiatric disabilities, pleurisy with effusion heads the list to the age of 24, duodenal ulcer is most important between 25 and 39, while arthritis is the most important in the over 40 group.

Table II.

Analysis of Non-Traumatic Medical Repatriations by 5 Year Age Groups

	Under 20	*20 - 24*	*25 - 29*	*30 - 34*	*35 - 39*	*Over 40*	*All ages*
Psychopathic personality	*31.4*	*21.3*	*17.4*	13.1	9.0	9.5	15.5
Psychoneurosis	3.9	9.5	10.8	*14.5*	*10.9*	11.0	11.0
Peptic ulcers	2.0	5.8	6.9	8.8	13.5	10.1	8.3
Psychotic and prepsychotic states	17.6	11.8	8.1	8.0	4.0	1.8	7.7
Chronic arthritis	2.0	1.8	3.0	3.3	6.9	*11.9*	4.7
Pleurisy with effusion	5.9	9.6	4.2	2.4	1.6	0.0	4.3
Diseases of the eye	3.9	4.1	4.0	3.5	4.2	4.3	4.0
Diseases of the ear	2.0	5.0	4.2	2.7	1.9	2.9	3.6
Pulmonary tuberculosis	2.0	4.8	3.3	2.7	2.4	1.8	3.2
Chronic bronchitis	0.0	0.9	1.7	4.5	2.4	6.3	2.8
Asthma and asthmatic bronchitis	2.0	1.0	2.4	2.7	2.1	1.6	1.9
Malignant neoplasms	0.0	0.7	0.6	1.2	0.8	2.2	1.0
Others	27.3	23.7	33.4	32.6	40.3	36.6	32.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

General Effect of Age on the Non-Traumatic Repatriation Rate

In this section personnel reboarded to a non-effective level for non-traumatic conditions have been arranged in three-year age groups and the non-effective rate per thousand per year obtained for each group (Table III). There is a progressive increase in rate with each age group. The high rate of 83.0 per thousand in the over 44 group is to a certain extent accounted for by the tendency to use medical boards as a convenience in disposing of over-age personnel who have become unemployable from the army point of view, and in whom a search is made for physical disability to facilitate their disposal. The low over-all repatriation rate of 20.2 per thousand per year speaks well for the thoroughness of the medical screening in Canada prior to embarkation and the effectiveness of the R.C.A.M.C. overseas in preventing complete wastage.

Table III.

Effect of Age on Non-Traumatic Medical Repatriations

Age group	*Cases*	*Repatriation rate per 1,000 per year*
19 -	51	10.2
20 - 22	341	13.5
23 - 25	575	15.8
26 - 28	377	16.1
29 - 31	375	21.2
32 - 34	269	23.0
35 - 37	239	35.2
38 - 40	220	38.1
41 - 43	147	44.2
44 -	216	83.0
	2,810	20.2

The Age Factor in Certain Diseases

In this section an attempt has been made to indicate the effect of age on the development of non-effectiveness, from the army point of view, of the following diseases and conditions: psychopathic personality, psychoneurosis, pulmonary tuberculosis, pleurisy with effusion, bronchitis, gastric ulcer, chronic arthritis, diseases of the skin and herniated intervertebral disc (Table IV). In this group the diagnosis of peptic ulcer, pulmonary tuberculosis and pleurisy with effusion automatically results in the awarding of a 5 grading, hence the survey is complete for these diagnoses. In the other conditions mentioned above a grading higher than 5 may be awarded and hence the survey is incomplete as to total cases.

The age at the time of boarding to a pulhems grade 5 does not necessarily indicate the age at the onset of the condition, *e.g.*, personnel in the peptic ulcer group possibly carried on despite symptoms for some time prior to boarding, and many in the psychiatric group may have been given a trial in a higher grading for a time. Nevertheless, the age, at the time of boarding, does indicate when the patient or the Medical Board decided that army standard of activity could no longer be maintained. Another factor to consider also is that in an attempt to prevent

Table IV.

The Age Factor in Disease

Age group	Psychopathic personality Cases	Psychopathic personality Rate per 1,000	Psychoneurosis Cases	Psychoneurosis Rate per 1,000
19 -	16	3.2	2	0.4
20 - 22.....	71	2.8	28	1.1
23 - 25.....	119	3.3	56	1.6
26 - 28.....	69	3.0	44	1.9
29 - 31.....	50	2.8	53	3.0
32 - 34.....	36	3.1	37	3.2
35 - 37.....	23	2.8	25	3.1
38 - 40.....	22	3.8	30	5.2
41 - 43.....	20	6.0	16	4.8
44 -	11	4.2	19	7.3
	437	3.1	310	2.2

Age group	Pulmonary tuberculosis Cases	Pulmonary tuberculosis Rate per 1,000	Pleurisy with effusion Cases	Pleurisy with effusion Rate per 1,000
19 -	1	0.2	3	0.6
20 - 22.....	14	0.6	35	1.4
23 - 25.....	28	0.8	49	1.4
26 - 28.....	11	0.5	14	0.6
29 - 31.....	16	0.9	11	0.6
32 - 34.....	4	0.3	4	0.3
35 - 37.....	6	0.7	4	0.5
38 - 40.....	7	1.2	2	0.3
41 - 43.....	2	0.6	0	0.0
44 -	2	0.8	0	0.0
	91	0.65	122	0.88

Age group	Bronchitis Cases	Bronchitis Rate per 1,000	Gastric ulcer Cases	Gastric ulcer Rate per 1,000
19 -	0	0.0	0	0.0
20 - 22.....	3	0.1	3	0.1
23 - 25.....	5	0.1	5	0.1
26 - 28.....	7	0.3	6	0.3
29 - 31.....	16	0.9	3	0.2
32 - 34.....	10	0.9	6	0.5
35 - 37.....	8	1.0	9	1.1
38 - 40.....	3	0.5	11	1.9
41 - 43.....	4	1.2	5	1.5
44 -	22	8.5	3	1.2
	78	0.56	51	0.36

Age group	Duodenal ulcer Cases	Duodenal ulcer Rate per 1,000	Chronic arthritis Cases	Chronic arthritis Rate per 1,000
19 -	1	0.2	1	0.2
20 - 22.....	14	0.6	8	0.3
23 - 25.....	30	0.8	9	0.3
26 - 28.....	23	0.9	12	0.5
29 - 31.....	25	1.4	14	0.8
32 - 34.....	20	1.7	8	0.7
35 - 37.....	24	2.9	15	1.8
38 - 40.....	14	2.4	19	3.3
41 - 43.....	12	3.6	20	6.0
44 -	18	6.9	25	9.6
	181	1.3	131	0.94

Age group	Skin diseases Cases	Skin diseases Rate per 1,000	Herniated intervertebral disc Cases	Herniated intervertebral disc Rate per 1,000
19 -	2	0.4	0	0.0
20 - 22.....	9	0.4	1	0.0
23 - 25.....	15	0.4	5	0.1
26 - 28.....	5	0.2	15	0.6
29 - 31.....	8	0.5	10	0.6
32 - 34.....	6	0.5	6	0.5
35 - 37.....	10	1.2	9	1.1
38 - 40.....	8	1.4	3	0.5
41 - 43.....	4	1.2	7	2.1
44 -	7	2.7	5	1.9
	74	0.53	61	0.44

undue wastage medical boards may favour a higher category in the younger age groups than in the older.

In the psychiatric group, age appears to be a definite factor in non-effectiveness due to psychoneuroses, but not in psychopathic personality, confirming the constitutional nature of the latter condition.

Pleurisy with effusion shows a definite increase between the ages of 20 and 25, while pulmonary tuberculosis shows no apparent age correlation. This finding was confirmed by extending the survey to include another 130 cases of pulmonary tuberculosis and another 100 cases of pleurisy with effusion. This finding is presumably due to the effective x-ray screen on recruitment and indicates that when all cases of tuberculosis have been removed from an army population by screening the case rate for pulmonary tuberculosis is the same in each age group.

In the peptic ulcer group there is a progressive increase with age. The overall ratio between gastric and duodenal ulcer is 1: 3.5. The proportion of gastric to duodenal ulcer increases with age.

Chronic arthritis, skin disease, chronic bronchitis and herniated intervertebral disc all show a progressive increase with age. The age change with herniated intervertebral disc suggests that the ageing process as well as trauma favours the development of this condition.

Summary and Conclusions

1. During the last six months of 1944, a period of considerable activity for the Canadian Army Overseas, of 8,593 personnel medically reboarded to a non-effective level, approximately 60% were for wounds the result of enemy action, 10% for injuries the result of accidents and 30% were for non-traumatic disease conditions.

2. In the non-traumatic disease group 35% of the non-effectiveness was due to psychiatric disease. The most important non-psychiatric disability was duodenal ulcer particularly between the ages of 25 and 39. Pleurisy with effusion was the most important non-psychiatric condition below this age group, and arthritis above it.

3. There is a rapid rise in the non-traumatic repatriation rate with age.

4. Pleurisy with effusion shows a peak between the ages of 20 and 25. Pulmonary tuberculosis shows no age relationship in a screened population.

5. Bronchitis, gastric ulcer, duodenal ulcer, chronic arthritis, skin disease and herniated intervertebral disc all show an increase with age.

This survey was prepared under the direction of the Director of Medical Services, Canadian Military Headquarters, Canadian Army Overseas. The authors wish to express their thanks to Prof. Lancelot Hogben, D.B.R. the War Office, for his advice in presentation of the data and for access to equivalent surveys for the British Army.

THE TREATMENT OF ASTHMA

By G. D. Stanley, M.D.

Calgary

THE writer's survey of the available literature has suggested in the summarized classification below, a conception of asthma, starting at its earliest stage and following its various stages of development to its most advanced condition. The summary includes the consideration of the different ways in which asthma shows itself from time to time throughout the course presented in large numbers of all types of cases. It is conceded that some of those factors which we are assessing herewith as fundamental may have reached only the semi-theory stage, scientifically speaking; but it is contended on the other hand that the assumed liberty is helpful without being harmful, to our intention, and affords an understanding for present treatment purposes that promotes more effective results in daily practice. It must be admitted that even under the most favourable efforts in treatment, we shall continue to face discouragement in results, sufficient to keep us humble, and to urge the need for continued careful research work.

In order that a simpler yet broader understanding of asthma may be presented, it is suggested that we approach the study for classification purposes, by imagining an extended number of individual cases presenting all possible grades of symptoms and signs, including those from the mildest to the most intense, and having them arranged to stand in a single line, as it were, case after case in consecutive order according to their increasing degrees of complaints. Next, let the reader's imagination, by a magic wand if preferred, convert his supposedly concrete line of individual cases of asthma into an abstract asthmatic measuring scale or gauge, against which the doctor, for diagnostic and treatment assessment, may fit into their proper niches on the scale all grades of future cases with which he may come in contact. It is hoped that in this manner the treatment of each case may be individualized and dealt with in accordance with an approved and systematized procedure.

It is granted promptly that the hope just outlined is more idealistic than can be fully realized, and that the niches on the imaginary scale cannot be quite as actual as are set forth; but for practical purposes in diagnosis and treatment they are real enough to serve as a helpful working guide, and superior to the system that assumes that asthma is just asthma and demands a similar procedure for all cases.

Lastly, an encouraging assurance persists that science is advancing hopes for a better future understanding of asthma in general. More important still, scientific research is placing more and more emphasis upon the possibilities of the preventive side of treatment. Accordingly this paper hopes to offer some suggestions on this phase of treatment also.

The following outline constitutes the treatment summary referred to above.

SEVEN NICHES IN THE ASTHMATIC SCALE

Group 1.—Cases presenting a localized nasopharyngeal irritation with turgescence of the membrane, accompanied by varying degrees of reflex bronchial spasm, but in which allergy or infection factors are absent. Substances such as certain dusts, smoke, etc., may cause a purely mechanical irritation, and yet be free from any other etiological factors. It is true allergic proteins such as pollens may be carried in dust, but this group excludes all such.

Group 2.—Cases in which "hay fever" or such nasopharyngeal irritation exists, accompanied by definite bronchial spasm, and in which allergy to vegetable or animal proteins from

pollens or animal hair, for instance, becomes a factor, but no infection factor obtains, such as acute bronchitis or purulent rhinitis, for instance.

Group 3.—Cases where the same nasopharyngeal signs as in No. 2 present, without any definite nasal sinusitis or rhinorrhœa, and yet have frequent recurrent attacks of "common cold" accompanied by marked and intermittent attacks of bronchial spasms, and also show the presence of a definite allergy factor, but still no apparent bronchial infection such as acute bronchitis.

The leucotaxin theory* comes into consideration in this group in respect to allergy susceptibility (see under No. 4). Here must be placed those patients in whom the psychogenic aspects of asthma are of such emphasis. They are mostly children from 3 to 14 years of age, with an occasional older juvenile. In these cases the actual asthmatic phases of the attacks are allergic in origin, but almost certainly incidental only in the complaints exhibited.

Group 4.—This is the same as No. 3 but with the superimposed infection factor added, and manifested by accompanying periodic attacks of acute or subacute bronchitis and usually an increased rhinitis though not necessarily any purulent sinusitis. The bronchitis is accompanied by much cough and at the start of an attack is non-productive. Later the bronchial secretions are stringy and in viscid plugs of mucus. The sedimentation rate is usually increased.

The leucotaxin theory in multiplied effect has begun to play an important part, and the recurrences of interval attacks in this group come and go according as the leucotaxin or the opposing enzyme prevails in determining the resistance volume of the patients to the allergy and infection factors.

Group 5.—The bronchitis is now chronic and permanent in varying degrees of activity. The bronchial mucus is constant and periodically is increased in amount and viscidity and expelled from the smaller bronchi only with increased efforts. The bronchial spasms are definitely increased in frequency and intensity and the negative pulmonary pressure alters presumably in proportion to the obstruction to the airway by the viscid mucus plugs and the purulent bronchial secretions; 80% or more of these cases show a rhinorrhœa also.

In this group the leucotaxin is prevailing steadily, although the enzyme succeeds in mitigating periodically the degrees of intensity and of continuity of the attacks.

Group 6.—Years of domination by the leucotaxin has wrought further pathological changes in the bronchi so as to add the asthmatic bronchiectasis which is found in relation to the small bronchi and resulting from the persistent obstruction to the airway. This bronchial disease has gradually increased with time. The interval ups and downs of the degree of asthmatic spasms continues, even though the actual disease is permanent.

Group 7.—This shows increased bronchial disease. It also shows involvement of the larger bronchi with bronchiectatic saccules.

TREATMENT

General.—Under each group we shall outline suggestions for treatment. However, we shall offer some general observations in regard to treatment, also some suggestions which may be accepted as applicable in the treatment of all groups.

There is no one agent or single procedure that can be accepted as all-sufficient at any stage of asthma. Fairyland has provided no special charm for asthmatic patients. Its treatment is comparable to that of rheumatoid arthritis in that it demands the combination of all available procedures, and still carries a hope for something more to follow.

The resistance of patients in all groups should be maintained at the highest possible level. Any physical defect or habit that lowers the standard of health lowers the ability to resist the underlying causes of asthma in susceptible persons. Frankly, this paper prophesies that a not too distant day will recognize all stages of asthma as having allergy or some comparable susceptibility at their origin. Such allergy persists in later stages, but wide and permanent pathological conditions have developed from infection processes far beyond the initial allergy. I, therefore, urge that the greatest hopes for radical results lie in preventive treatment; hence the need to provide means and measures to overcome the patients' susceptibilities, specific allergies and bacterial infections. Our first step

* This theory suggests that an inflammatory focus may give rise to something (leucotaxin) which is transferred, probably by the bloodstream, independently of the transfer of any actual organisms or bacterial toxin.

will utilize every test the laboratory can provide and use them efficiently. Many failures in treatment today happen by reason of failures in diagnosis, and many such failures as regards allergies are failures not because of lack of tests but because of the way they are done, or rather, not done. We have plenty of unbridged gaps in the pathway of causal discovery, apart from those created needlessly, and this paper refuses to adopt the fatalistic attitude respecting the efforts to bridge them. Advance has been definite, and is still hopeful. Our text at this juncture is preventive medicine. Hence we vision the hope of keeping Group 2 patients at Group 2 level, and regarding patients in Groups 3, 4, 5 *et al.* as cases where too frequently someone has "missed the boat". Idealistic? Certainly! Yet, when discussing treatment of asthma, it is fashionable in many circles to hold desensitization in scorn! 'Twas ever thus on the road to medical progress.

Further, it should be emphasized that desensitization should be repeated as frequently as recurring symptoms and laboratory tests indicate. We urge watchfulness against recurrences of attacks from lack of preventive measures.

Desensitization is recommended in all groups, even though the immediate progress of treatment in the later groups appears doubtful. Desensitization is emphasized purposely and not because asthma following some unquestioned primary lung conditions such as lobar pneumonia. or atypical virus pneumonitis has been overlooked, but because such exceptional unexplained illustrations are still not explained.

Group 1.—Here is where prevention predominates. Avoid irritants to the nasopharyngeal membrane, such as dusts in agricultural work, milling, stone-cutting and such occupations. A close-fitting respiratory mask helps. Avoid all types of nasal drops, except perhaps neosynephrin jelly or nebulizer oil (not atomizer). Avoid inhalants. It is assumed that allergy has been excluded by tests.

In this group and all later groups hot baths at bedtime should be avoided. When taken in the morning they should be followed by cool or cold baths. Woollen underwear tends to promote active perspiration, and the cooling of the skin then promotes turgescence of nasal membrane and reflex bronchial spasms. Further, an even temperature in the bedroom particularly in the early morning hours is required for the same reason. Hence, the night ventilation, especially in winter, demands careful moderation. These suggestions apply throughout all groups.

Group 2.—Desensitization as indications and repeated tests demand should be attended to every 3, 6 or 12 months. Exposures to allergic proteins should be avoided as far as possible. The respirator mask may help in certain instances. Apart from laboratory reports for positive allergens an elimination diet is suggested for two weeks, and foods added singly thereafter every two or three days so as to check for possible allergic reaction. This precaution should also apply in later groups, but of course, the lower the group the more difficulty there is in assessing the effects.

Locally, neosynephrin may be used for short periods only. Bronchial spasm may require adrenalin chloride (m vi, intramuscularly). One should avoid its frequent use in cases in which the psychogenic factor prevails.

Group 3.—The suggestions outlined under Group 2 will apply here also. It is admittedly difficult to separate this group from Group 4. Hence it is recommended that a course of stock vaccine be given bi-weekly in slowly ascending doses over a period of two months, and such course be repeated once yearly at least, and began during an intermission period.

This group and Group 4 include a large number of children, where the psychogenic factor predominates and where the actual asthma is frequently of less significance than the child's fear, promoted by over-indulgence from anxious parents. In such cases, the child's mother often needs advice more than the child. It should be realized at once that it is altogether impossible to make headway with the child's treatment until the doctor has the informed co-operation of the mother in reassuring the child and in withholding the family's anxiety from the child. Dilantin sodium b.i.d. is now being tried for its psychosomatic effect in such children. Overexertion should be avoided particularly in children, and the remarks above regarding sweating, clothing, bedroom ventilation and elimination diet are of definite significance.

In adults the local treatment of the nasal membrane as given under Group 2 will apply. Adrenalin chloride may be indicated for relief of bronchial spasms for a short course only.

Phenobarbital may be used for sleep, if indicated.

Group 4.—The comments offered above regarding allergy tests, desensitization, elimination diet, over-exertion, night bathing and room ventilation, all apply with even more significance. The same applies to the psychogenic factor in children. An autogenous vaccine used for three or four months bi-weekly is helpful in some cases. If the autogenous vaccine is not available, a catarrhal vaccine used in a more quiescent interval and cautiously helps to keep resistance against infection higher. Breathing exercises and short-wave therapy lessen the cough and assist in expanding bronchial capacity. Postural drainage has its place, twice daily for ten to fifteen minutes. Some cases are benefited when this is followed by the use of lipiodol introduced intratracheally. Use 7 to 10 c.c. on each side weekly for several weeks as indicated by symptoms. The lipiodol travels to the smaller bronchi and in some cases dislodges the obstructing mucus plugs into the larger bronchi and thus relieves spasms. During recent months Dr. Williamson of the Department of Otolaryngology of this Clinic has been providing these cases with suction through the bronchoscope on both sides and following immediately by insufflations of sulfanilamide into the bronchi through the bronchoscope. The patient is prepared in the usual way by anæsthetizing the airway locally, and then given intravenous pentothal sodium anæsthesia, sufficient to insure the introduction of the bronchoscope and the elimination of that element of fear that is usually associated with bronchoscopic work under local anæsthesia alone, and prejudices against the repeating of treatment. A continuous flow of 100% oxygen via the bronchoscope overcomes anoxia. These treatments are repeated as the progress of the case demands.

Inhalants are not advised. Iodides by mouth in heavy doses are useful. Adrenalin chloride in 6 minim doses p.r.n. is useful in some cases. It is not advisable to continue its use in repeated doses when it has not given relief.

In intractable cases aminophyllin (intravenously) is given a.m. and p.m. promptly. The administration may later be made through the rectum t.i.d. after the extreme spasm has relaxed. Sodium iodide (i.v.) also is given during the intractable period. Adrenalin is not used until the patient is ambulatory. Even then aminophyllin *per os* acts better than adrenalin in some cases. The following will summarize the best procedure during the violence of an intractable attack.

(*a*) Continuous 100% oxygen through B. and B. mask —or better still if available is continuous oxygen 25% and helium 75%. (*b*) Aminophyllin (i.v.) b.i.d. (*c*) Demerol (i.m.). (*d*) No morphine, even dilaudid is dangerous. (*e*) Sodium iodide solution (i.v.). (*f*) If necessary, ether in oil per rectum, or better still, sodium pentothal per rectum. Later only, use adrenalin chloride (i.m.) and certainly not during the intractable spasm. (*g*) Ether in peanut oil, 1 c.c. of each given (i.m.) has a sedative effect.

Group 5.—All that has been said under Group 4 applies to Group 5, only more so! The use of lipiodol and the bronchoscopic insufflations are particularly beneficial in these patients. The avoidance of physical exertion and of perspiration is emphatic. The same applies to the cooler night air in the bedroom which promotes spasms in the early morning as a rule.

The following old prescription is good for general use in Groups 4, 5 and 6.

℞ Pot. Iodide iv
Am. Carb. iv
Tr. Bellad. vi
Spts. Chlorof. i
Aqua ad vi
Sig. i ex aq. q.i.d.

Groups 6 and 7.—Nothing further can be added for treatment in these groups.

214 Sixth Ave. W.

Case Reports

SEVERE ALLERGIC REACTION TO INTRAMUSCULAR PENICILLIN

By Captain I. C. Price, R.C.A.M.C.

On the afternoon of July 13, 1945, a Canadian Army driver fell from his motorcycle, injuring his right leg. When first seen, he showed a wound one and one-half inches in diameter, on the lateral aspect of the leg, three inches above the malleolus. The same evening he was admitted to a Canadian General Hospital. At the time of admission the whole leg, from knee to ankle, was swollen and tense. Under general (pentothal) anæsthesia, the wound was enlarged, and much extravasated blood was turned out. A vaseline gauze dressing was applied, and the wound was left partially open. The patient was started on intramuscular penicillin, 20,000

Oxford units every three hours, day and night. This was continued until the morning of July 18. During this time, the patient ran an afternoon temperature of 100° F., with a normal morning temperature. On the morning of July 18, a punctate purpuric eruption appeared on the flexor surfaces of the arms, the abdomen, chest and back. It was very slightly pruritic. That evening a small urticarial wheal appeared over the left deltoid area. At midnight of July 18, the patient was restarted on penicillin, dosage as before. This was continued until noon on July 20. Meanwhile, the local wound had healed well, and had been closed on July 19. By noon of July 20, the purpuric eruption had entirely disappeared, and the patient developed a severe, generalized giant urticaria. It was accompanied by a peri-articular arthralgia, so severe that the patient would neither move, nor allow others to move him. With the appearance of the urticaria the patient's temperature became elevated to 101° F., and so remained with slight morning remission, until he improved three days later.

On July 21, the leucocyte count was 17,700 with 88% polymorphonuclear leucocytes, 12% lymphocytes. There were no eosinophiles. Red cells showed 6,200,000 cells. Urine taken the same day showed a specific gravity 1.026, an occasional pus cell per high power field, 8 to 10 hyaline casts per high power field, a negative benzidine test.

Treatment consisted of the intramuscular injection every eight hours of adrenalin in oil (1:500) 1 c.c. This was supplemented as necessary with subcutaneous injections of aqueous adrenalin (1:1,000) 0.5 c.c. Locally, calamine lotion containing menthol 0.5% was used, every three hours. Recovery was complete within four days.

When the patient had recovered, the following cutaneous tests were carried out: (1) a scratch test with an aqueous solution of penicillin, containing 15,000 Oxford units per c.c. Sterile distilled water was used as a control. (2) Patch tests with the same materials. (3) An intracutaneous test with serum of a patient, who had been on penicillin (intramuscular) therapy for 2 days, and had received penicillin (20,000 units) one-half an hour before blood was taken. Normal human serum was used as a control. Scratch and patch tests were entirely negative. Intracutaneous injection of serum containing penicillin showed, within ten minutes, a wheal three centimetres in diameter with pseudopodia, and surrounding erythema. Control test with normal serum was negative. A white cell count done at this time showed 9,000 cells, with normal differential. Urine was entirely clear.

DISCUSSION

Cases of urticaria occur not infrequently during the intramuscular injection of penicillin. Of 16 such cases seen by the author, this was the first preceded by a punctate purpuric eruption, and was the most severe. Skin tests suggest that urticarial eruptions due to penicillin require an allergen, presumably a penicillin-protein mixture, rather than penicillin alone. Presumably the patient's own serum provides the necessary protein.

PRIMARY CARCINOMA OF THE LIVER*

By W. R. Feasby, B.A., M.D.

Toronto

Primary carcinoma of the liver is a rare disease. Rokitansky observed in 1845 that it probably existed as a clinical entity. In the 1880's Sabourin, Hanot[1] and others produced histological evidence that there was such a disease.

In 1901, Eggel[2] collected 117 sections from the 163 cases then reported in the literature. In 1906 Hale-White reported 14 cases in a series of 19,500 autopsies, an incidence of 0.13%. Counsellor and McIndoe[3] reported an incidence of 0.14% in 1933. In the same year K. J. Smith[4] gave an incidence of 0.56%. Herxheimer[5] has stated that there are some 600 cases in the literature, and Abel is of the opinion that this represents most of the cases which have been recognized. (Many believe that there are more, still unreported. For instance, Boyce and McFetridge,[6] report 24 cases in 1934, only one of which had previously been mentioned.) Generally, up to ½% of cases among white races coming to autopsy, have this disease.

Boyce observed that in Europe 0.21% of autopsies showed this disease, while observers in the Orient found 1.05%. Tull[7] reports a high incidence among the natives of Singapore. Strong and Pitts[8] reported that 7% of the Orientals who came to autopsy in Vancouver had this disease, while only 0.19% of white races did. Boyce noted that 18 of his 28 cases were negroes; a

* From the Medical Service of Dr. H. K. Detweiler, Toronto Western Hospital.

high incidence in spite of the 50% negro hospital population.

Age.—The disease is rightly considered to be rare before the age of 40, but Kilfoy and Terry[9] list 44 cases from the literature where it occurred under 18 years. Of these only 19 were proved cases. Eggel gives the average age incidence as 53 and 52 years for men and women respectively.

Sex.—The studies of sex incidence show that it affects males in three out of four cases. Eggel recorded 63 male and 37 female cases. Strong and Pitts had 9 males in 12 cases. Tull had only one female in 134 cases. Kilfoy and Terry had several girls under 18 in their series.

Etiology.—The etiology of the disease is a subject of much controversy. Trauma has been mentioned as a cause by various authors: Hicks;[10] Crawford;[11] Mast *et al.*[12] and others. This is of doubtful general significance. Parasitic infection may play a part because Tull found a history of this in almost every case. Liver flukes were found in 38 of his cases. Strong and Pitts found none in their Oriental cases but fluke-infested fish was often a common article of diet among these Chinese. Nothing beyond co-incidental association has been shown for malaria, syphilis, typhoid fever, or tuberculosis.

The occurrence of primary carcinoma of the liver is associated with cirrhosis of the liver in 70 to 80% of cases. Boyce found it in only 42% and K. J. Smith in 39% of cases. That cirrhosis would seem to be the precursor rather than the result of malignancy is suggested by the following theory. Winternitz[13] pointed out that the demand for repair in liver tissue is readily met, and that on occasion, this ready response to a demand for repair might result in hyperplasia. The liver cells might lose their specific functions and, losing their usefulness in the general bodily economy, become parasitic. The balance between function and growth having been disturbed, these cells would be potentially malignant. The onset of malignant neoplasia with concomitant hypervascularity and increasing pressure in liver parenchyma make further cirrhotic change very probable.

Diagnosis. — Diagnostic points include: The patient is more often a male over 30 years of age. A large mass is felt in the right lobe of the liver. No primary tumour can be found elsewhere to explain marked and usually rapid cachexia. Jaundice is usually slight and terminal. Abdominal ascites is present. There is unexplained mild fever.

Pathology.—The tumours are usefully classified by microscopic section. Two types are usually described, that having chiefly the liver parenchyma cell type,[1] and the bile duct cell type.[2] A mixed variety also occurs. Metastases are not very common and Levitt and Levy[14] report the following order of frequency: lung, pleuræ, lymph nodes. They found no secondaries in bone or spleen, but the latter was enlarged in half the cases.

CASE REPORT

Miss V.B., aged 21, domestic. Admitted May 15, 1937. Died July 27, 1937.

History.—From Christmas time, 1936, this girl noticed some loss of energy, but was otherwise in her usual good health until March, 1937. At that time she began to notice slight soreness of the epigastrium associated with the eructation of gas after meals, and a poor tolerance for fried foods. On May 15, 1937, she noticed a mass in the upper part of her abdomen which was tender to the touch. She also developed a number of small red spots over the palms of her hands. On May 24 she noticed light-coloured stools and slightly darker urine. At about this time she began to lose weight and strength fairly rapidly.

Past illnesses. — Measles and mumps in childhood. Tonsillectomy, 1934. Scarlet fever, 1936. *Family history.*—Her father had a doubtful history of malignancy in a local lesion on his wrist. Her paternal grandmother died of carcinoma of the cervix. A paternal uncle died, having been shown at operation to have a carcinoma in the duodenal region.

Examination.—This girl was an undernourished adult female, lying propped up in bed. Her temperature varied between 99 and 101°. Pulse rate was 88. She had several carious teeth. The chest was not remarkable. Examination of the abdomen revealed enlargement of the liver to a hand's breadth below the costal margin in the midclavicular line. Liver dullness was found by percussion to the level of the fourth rib. The anterior splenic border was palpable the same distance below the left costal margin. Veins on the anterior abdominal wall were enlarged, but not tortuous, and drained upwards. The navel was flattened, and shifting dullness was demonstrated. At first the right, and later both ankles showed pitting œdema. The skin was thin and poorly nourished. On the palms of the hands only, small red spots from 2 to 12 mm. in diameter, were noted, which did not disappear on pressure, and were not tender. *Urinalysis.*—Not remarkable except for the presence of bile, but not urobilin; 6 to 8 pus cells were seen in the uncentrifuged specimen per high power field.

Blood examination.—Hgb. 71%. Red cells numbered 4.9 m. per c.mm., and the white cells 7,000 per c.mm. Blood films stained by Hasting's method showed nothing abnormal about the red or white blood cells, *but a very great increase in the number of platelets.* The platelet count was usually about 600,000 per c.mm. The blood Wassermann was negative. Repeated blood cultures were negative and agglutination tests for the T.A.B. group, *B. abortus* and *B. melitensis* were negative. *The fæces* showed a normal content of urobilin and fat. The van den Bergh readings were within normal limits. *Peritoneal fluid,* obtained by paracentesis was sterile and showed no malignant cells on centrifuging and sectioning. *X-ray.*—The chest films of May 18, 1937, showed nothing more than increased linear markings. *Fluoroscopy.*—Showed the right diaphragm to be high and moving poorly.

Differential diagnosis.—The clinical and laboratory findings strongly suggested that the disease principally involved the liver, and in view of the remarkably rapid wasting it seemed justifiable to consider the process malignant. The possibility of unusual disease in this zone, such as echinococcus infestation, amœbic abscess, abdominal lymphadenoma, or malaria, was ruled out, partly on the negative liver puncture findings, and partly on the lack of clinical or laboratory evidence to substantiate them. Attention was then directed to the remarkable finding of hyperthrombocytæmia, and an attempt was made to link this up with the enlargement of spleen and the spots on the hands. Increase in platelets has been found in variety of conditions including myeloid leukæmia, Hodgkin's disease, multiple thromboses of portal veins in the liver, Banti's disease, and primary carcinoma of the liver. It occurs of course, also, after surgical removal of the spleen. All but primary carcinoma of the liver having been ruled out, attempts were made to substantiate this provisional diagnosis. This was not accomplished, but it stood, because no primary source for metastases could be found. It was not possible to state definitely the type of malignant growth, although hæmangendothelioma was ruled out on the absence of bruits or palpable pulsations over the surface of the liver. The splenomegaly was explained on the operation of two factors: (*a*) primary intrahepatic disease with portal obstruction and (*b*) the destruction of excess platelets.

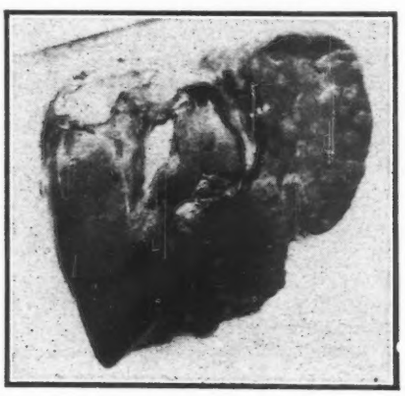

Fig. 1.—Shows the posterior aspect of the liver.

Clinical course.—From the time of admission to hospital, this girl seemed to melt away, so rapid was the cachexia. With this was associated marked and distressing weakness. Ascitic fluid was withdrawn on several occasions, one or two litres at a time. Toward the end she vomited unchanged food frequently with some blood-flecking. The termination of the disease was death from cachexia, with right-sided basal bronchopneumonia.

Post mortem performed three hours after death, revealed the following: (1) primary carcinoma of the liver; (2) secondary carcinoma of lungs with right lower lobe bronchopneumonia; (3) abdominal ascites; (4) enlarged spleen, with accessory spleen; (5) bilateral pyelonephritis.

Liver (Fig. 1).—This organ was massive and weighed 5,880 grams. The capsule was thick and smooth except for some bulging, firmer bosses on all its surfaces. Very little normal liver tissue remained and this was greyish in colour. There were instead, innumerable tumour nodules varying from 1 mm. to several cm., in diameter, scattered throughout the liver. Many of these were bile-stained. The smaller ones were solid but the larger ones were soft and a few were cystic and contained yellowish fluid within their walls. Microscopically, stained sections showed that the remaining liver tissue was pale-staining and had many coarse fatty globules. Near the nodules of new growth there was fibrous hyperplasia in the portal zones. The cells of the carcinoma stained deeply. There were cells growing in solid sheets, surrounded by narrow compact capsules with a few trabeculæ extending into the sheets. Many of the cells showed fine vacuolation. Many areas of necrosis were seen.

The spleen.—This weighed 400 gm., and was uniformly enlarged and smooth. Microscopic sections showed no evidence of infarction or neoplasm.

The lungs.—In gross there was bronchopneumonia on the right side and there were well-defined tumour nodules scattered throughout both lungs. Microscopic sections showed that the secondary nodules of carcinoma were growing in solid sheets of cells which resembled the liver parenchyma. Some occurred in rosettes which were dilated, so that a bile duct was present.

DISCUSSION

The case is unusual because it occurs in such a young woman, but is by no means unique. The tumour falls into the group having mixed types of cells present. This is more uncommon than the unmixed types, but has often been remarked.

The polythrombocythæmia is important here because it was this point which led to the correct ante-mortem diagnosis. The curious mottling of the hands was of a kind not previously observed by any of the staff here. The significance of these spots is completely obscure.

SUMMARY

1. The incidence of primary carcinoma of the liver as reported in the literature is reviewed, and certain outstanding features commented upon.

2. A case is reported with autopsy, of a female, aged 21, in which marked increase in the number of platelets was a feature.

I wish to thank Dr. G. Shanks who provided the pathological report.

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Medical Arts Bldg.

Venereal Disease Campaign

Management of Gonorrhœa in the Male

Diagnosis. — The diagnosis of gonorrhœa should be made only when the characteristic organisms are demonstrated by smear or culture methods. When the gonococcus cannot be demonstrated in a purulent or mucopurulent urethral discharge, the patient should be studied for other urogenital diseases. However, penicillin treatment should be given to all patients with a urethral discharge.

Treatment.—Penicillin is the drug of choice for the treatment of gonorrhœa. The initial treatment recommended is 50,000 units of penicillin intra-muscularly every 2 or 3 hours for a total of 200,000 units. When a favourable response is not evident by the third post-treatment day, as determined by change in character or disappearance of the discharge and the absence of gonococci by smear or culture, the treatment should be repeated. Patients not responding to a second course should be carefully studied for urological or other complications which interfere with the response to penicillin therapy. When necessary the patient should be referred to a urologist.

Determination of cure. — Relapses following penicillin treatment are infrequent. The presence of mucoid or watery urethral discharge is not sufficient evidence to continue treatment, provided the gonococcus cannot be demonstrated by smear or culture. The patient may be considered cured after clinical and laboratory examinations are negative at the end of observation period of three weeks.

Serological tests for syphilis.—It is particularly important that patients with gonorrhœa be carefully examined for evidence of syphilis. A serological test for syphilis should be done at the time of treatment for gonorrhœa. Since penicillin in adequate dosage is therapeutically effective in early syphilis as well as in gonorrhœa, it is possible that the development of primary syphilis may be retarded or masked by penicillin therapy of gonorrhœa. A serological test and clinical examination for syphilis should be performed 3 or 4 months after completion of treatment for gonorrhœa.

"Find V.D. Contacts — Report V.D. Cases"

Clinical and Laboratory Notes

BEDSIDE BRONCHOSCOPY*

(A New Position)

By V. Latraverse, M.D.

Montreal

In our mind, bedside bronchoscopy means a bronchoscopy done on a patient still in his bed.

In the literature, as reported by the Cumulative Index Medicus, we have not found any paper on bedside bronchoscopy.

In April, 1940, in Dr. Tucker's bronchoscopic clinic, at the University of Pennsylvania Hospital, we had the opportunity of seeing Dr. W. A. Lell and Dr. J. P. Atkins perform a bedside bronchoscopy. The patient was a coloured man with postoperative atelectasis; the patient's body was placed in a recumbent position oblique to the axis of the bed so that the shoulders were beyond the right edge of the bed. The bronchoscopic drainage made the patient able to survive his pulmonary collapse.

In our clinic, at Notre-Dame Hospital, we carried out the same technique with the use of the laryngoscope for introducing the bronchoscope.

By the end of 1940 up to now, our routine bronchoscopies on adults have been done without the aid of the laryngoscope. Later on, we applied this technique to the former bedside bronchoscopic procedure.

On November 16 and 23, 1943, two of our patients nearly died after bedside bronchoscopy. The shock was not due to the bronchoscopy in itself but to the displacements which put the patient in oblique position according to his bed. Both patients had atelectatic bronchial obstruction consecutive to a hæmothorax complicating several broken ribs; the first had 4, the other 10.

The next patient on whom we performed bedside bronchoscopy was a girl, 17 years of age. Dr. R. Descarie, surgeon, was called upon to do the surgical repair of her wounds characterized by traumatic liver fissure and multiple fracture of the pelvis. As she showed evident signs of postoperative pulmonary atelectasis, we were asked to do bedside bronchoscopy on her. She was very cyanotic and dyspnœic, rather in a stage of deep asphyxia.

On account of the patient's very bad condition, we decided to modify the Tucker method which would move the patient too much and lead her to death. Therefore, we used our new position as described in a recent article published in *L'Union Médicale du Canada.*[1] After three bronchoscopies, this girl avoided pulmonary

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*Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Section of Otolaryngology, Montreal, June 14, 1945; a moving picture illustrated the paper.

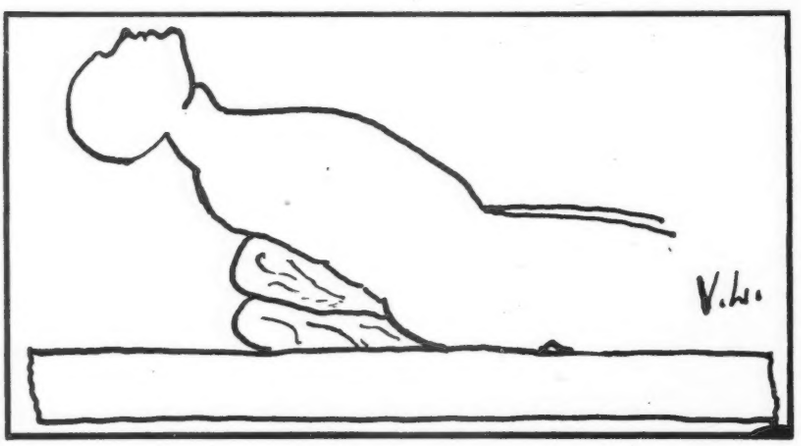
From the Section of Broncho-œsophagology and Laryngeal Surgery of Hôpital Notre-Dame, University of Montreal.

complications and was able to have her wounds well healed.

I recall you that the Tucker position consists in placing the patient's body obliquely to the axis of the bed.

A NEW POSITION FOR BEDSIDE BRONCHOSCOPY

This is a semi-sitting one (see illustration). For this purpose, we put one or two pillows beneath the patient's scapulæ. His body is held in the axis of the bed. Thus, the movements of the patient are lessened to the minimum.



Position for bedside bronchoscopy with the aid of pillows.

The head holder supports the head of the patient as for ordinary bronchoscopy carried out according to Chevalier Jackson's principles. The bed-head interferes very little with the endoscopic handling. This method asks for the introduction of the bronchoscope without the aid of the laryngoscope.

After the good result obtained with that girl, we have applied our procedure to different cases in which bedside bronchoscopy seemed indicated.

Indications.—Up to now, we have treated 16 patients with typical bronchial obstruction by viscous secretions. We have performed on them 32 bedside bronchoscopies without any postoperative complication. For each patient, 1 to 3 bronchoscopies were necessary to obtain free bronchial ventilation.

We figure the causal lesions which called for bedside bronchoscopy as follows:

1. Atelectasis induced by liver wound associated with multiple fracture of the pelvis (1 case).
2. Massive hæmoptysis due to mitral stenosis (1 case) and to agranulocytosis (1 case).
3. Postoperative atelectasis (4 cases).
4. Hæmothorax consecutive to fracture of ribs (2 cases).
5. Coma (brain trauma and uræmia) (3 cases).
6. Lung abscesses (late postoperative complication) (2 cases).
7. Bronchial asthma with heart failure (1 case).
8. Left lower lobe abscess on a patient with myelitis and bedsore (1 case).
9. Bronchopneumonia (1 case).

We consider the semi-sitting position with the aid of pillows makes possible bed-side bronchoscopy for several patients who would otherwise have been deprived of the salutary bronchoscopic aspiration.

Anæsthesia.—With cyanotic and almost unconscious patients, we do not use any kind of anæsthesia.

In the other cases, local anæsthesia was done by spray or intratracheal instillation of 2% pontocaine under laryngeal mirror guidance. No hypnotic drug was given. These patients were no more unco-operative than our ordinary patients in the bronchoscopic operating room.

SUMMARY

In this paper we have outlined the chief points and applications of a new position proposed for bedside bronchoscopy. We feel the following features are essential to minimize the displacement and discomfort of the patient and to make easier the operator's handling:

1. To put the patient in a semi-sitting position with one or two pillows placed beneath his scapulæ.
2. To hold the patient's body in the axis of the bed.
3. To introduce the bronchoscope without the aid of the laryngoscope.

We may summarize the indications of bedside bronchoscopy in the so-called bronchial obstruction by secretion occurring in a patient who cannot be moved without serious complication due to the procedure.

We consider that our method does extend the application of the bronchoscopic drainage.

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1560 East Sherbrooke Street.

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Editorial

THE RELATION OF GERMAN MEASLES TO CONGENITAL CATARACTS AND OTHER CONGENITAL DEFORMITIES

IN comparison with the rapidly changing picture in therapeutics, one may feel, on occasion, that our knowledge of disease processes is relatively static. Every so often however, a new disease is described, or a new relationship of disease entities is discovered, which revitalizes our interest. In this category was the interesting discovery of Gregg[1] in 1942 that there is a relationship between rubella occurring early in pregnancy and the appearance of congenital cataracts and certain other congenital deformities in the new born.

In the summer of 1940 there had been an unusually severe epidemic of German measles in south eastern Australia. The following year certain deformities began appearing in the new born. Making use of this material, Gregg presented his findings in 1942.[1] He reported on 78 cases of congenital cataract. A history of German measles early in pregnancy was obtained from the mother in all but 10 cases, that is, 87%. In 62 cases, or 79%, the cataracts were bilateral. The cataracts were of two types. In the first, there was a contrasting central area of dense white opacity surrounded by a smaller and less dense peripheral zone. In the second, the opacity was more uniform throughout. Owing to the inability to fixate, the children with cataracts developed a coarse, jerky, searching type of nystagmus.

The patients also presented other interesting findings. They were small and undernourished and were difficult to feed. Forty-four, or 56%, presented congenital heart disease. Patent ductus arteriosus apparently was common. The mortality rate was high. Also of interest was the fact that the children were sensitive to atropine. When used as eye drops for examination frequently, there was quite a general reaction, characterized by irritability, flushing, low fever and difficulty in feeding. Other children in the same families did not present any of these features, hence there was no suspicion that these defects were of a familial nature.

Gregg felt that there was very strong presumptive evidence that rubella was the causative agent. He was quite aware though, that possibly there might be another causative factor, in that many of the mothers had had sore throats and tonsillitis at the time of their illness. Concurrent with the rubella epidemic there had been an epidemic of sore throats. Hence, there might have been a mistake in diagnosis, a toxic erythema being mistaken for the rash of rubella. Further investigation was undertaken under the ægis of the National Health and Medical Research Council to eluci ate several aspects of the syndrome. As a result of this a very comprehensive study was carried out by Swan, Tostevin, Moore, Mayo and Black[2] which was published in 1943. Of 61 children, studied by this group, 36, or 59%, had congenital defects. Among the mothers, 49 gave a history of rubella during pregnancy, 9 had had morbilli and 2 had had mumps. Four gave a negative history. Of the 49 mothers giving a positive history of rubella: 31, or 63%, gave birth to children with congenital defects; 17, or 35%, of the children had cardiac anomalies; 13, or 27%, of the children, had cataracts (10 were bilateral); 7, or 14%, of the children, were deaf-mutes; 1, or 2%, of the children, had buphthalmos. All had some degree at least of microcephaly.

These investigators concluded that these changes indeed were due to rubella occurring in the mother early in pregnancy. They also concluded that if the rubella occur in the mother during the first two months of pregnancy her child is almost certain to have at least one congenital defect. If she be affected during the third month the chance of such an occurrence is reduced by about a half. In 1944 the same authors reported a further series of 12 cases with substantially the same findings.[3]

Further corroboration during the past year has come from the United States where reports have been presented by Reese (3 cases),[4] Rones (4 cases),[5] and Erickson

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4. REESE, A. B.: *Am. J. Ophth.*, **27**: 483, 1944.

5. RONES, B.: *Med. Ann. Dist. Col.*, **13**: 285, 1944.

(9 cases).[6] Their findings were in close agreement with those of the original authors.

The exact mechanism by which all these changes take place is of course unknown. However, other known facts permit some speculation which may well come near the truth. It is well known that embryonic tissue is peculiarly susceptible to the viruses. The use of embryonic tissue cultures for the cultivation of certain viruses is a common procedure. The important anlagen of the heart and eyes are laid down in the first three months of intrauterine life. It seems a fair assumption, then, that the virus of German measles, which usually produces only mild disease in the adult, may produce quite marked changes in the embryo. The decrease in the incidence of the deformities during and after the third month may well have something to do with the development of the placenta at this time.

The unfolding of the story of this voyage of discovery into the realms of clinical investigation has been fascinating to all those following it in the literature. It may well be that, with this lead, other similar factors in the causation of congenital deformities may be found. To the clinician, of course, it raises the question of whether or not an abortion would be in order in those cases where the rubella has occurred in the first two or three months of pregnancy. Further investigation is required in the development of a vaccine and in the evaluation of the use of convalescent serum in the prevention of this disturbance. As for the eye, Reese[4] feels that the cataracts should be needled at once, so that ocular fixation may be developed by the children. If fixation be delayed nystagmus will occur. J.V.V.N.

Editorial Comments

Pasteurization of Milk

The Health League of Canada is carrying on a campaign to obtain compulsory pasteurization of milk throughout Canada, and is doing its utmost to inform the public on the situation. The following extract from a recent article published by the League is of interest.

"Only one province in Canada—Ontario—at present has compulsory pasteurization legislation. More than 98% of all milk sold for fluid consumption in the province is pasteurized, and that percentage will be increased soon when rural areas which increased in population during war years will be brought under provisions of the legislation which applies to municipalities with populations of 300 or more and to other districts where pasteurization is feasible.

"Dr. A. E. Berry, director of sanitary engineering, Ontario Department of Health, recently said that in many areas where the greatest opposition developed to pasteurization, there is today complete satisfaction with the law enacted seven years ago, and milk consumption has more than doubled. He added that the sharp reduction in typhoid, undulant fever and para-typhoid is an effective answer to one-time critics of pasteurization."

6. ERICKSON, G. A.: *J. Pædiat.*, **25**: 281, 1944.

Ninth Victory Loan

The Ninth Victory Loan is now in progress, and we are asked to play our part in giving it publicity and support. This Loan aims at its very high objective to obviate the need for another Loan in the Spring of 1946, thus saving substantially in time, effort and expense. There should be little need to dwell on the tasks facing the country now that the war is over. The drain of our resources for munitions has ceased, but it is replaced by the very expensive task of restoring the country to a peace time basis. War service gratuities and re-establishment credits alone involve very large sums of money, quite apart from the various measures necessary to subsidize commerce in many respects. Then there is our obligation to help Europe, with food, money and material, all of which costs heavily. These requirements call for our greatest efforts. But there is yet another reason why we are asked to save our money by loaning it to the Government, and that is to aid in keeping down the spending which will tend to drive prices upward and bring about inflation, the gateway to the Valley of Desolation.

These are some of the reasons for supporting the Ninth Victory Loan.

Addendum

In the paper on "Observations on certain diseases of the tropics", in our last issue, by Lieut. J. K. McCorkle (M.C.), U.S.N.R., the statement regarding the treatment of malaria by atabrine should read: "The routine treatment . . . has consisted of atabrine 0.2 gm. q.6.h. for five doses followed by 0.1 gm. t.i.d. for five days, etc."

Medical Economics

FRANCE PROVIDES HEALTH SERVICES FOR SMALL INDUSTRIES

By Frank G. Pedley, M.D., Dr.P.H.

The value of a health service to industry has been widely appreciated and in most industrial countries the larger industries commonly provide a health service to their employees. Small industries, which invariably are more numerous than large ones and which employ collectively many more employees, have not usually been able to participate in the benefits of health services. Attempts have been made to group small industries on a regional basis and to create thereby a unit of 1,000 to 3,000 persons which would be sufficiently large to employ the services of a doctor and a nurse or medico-social worker.

These attempts have not been notably successful.

In France and particularly in the region of Paris, organization of small industries for this purpose has proceeded apace and at the present time, every industrial arrondissement in Paris has one or more medico-social centres where the local industries may secure a health and welfare service for their employees on the payment of an annual fee based on the number of employees served.

Curiously enough, many of these regional industrial health services owe their organization to the system of family allowances which has been operating in France for a number of years. It is perhaps worth noting this point, for ordinarily in thinking of family allowances, particularly in countries where such allowances are not paid, one thinks of them as a method of subsidy to the head of a family in recognition of his value to the State in rearing children, and one fails to appreciate certain subsidiary activities which are likely to develop in the train of family allowances and which in themselves may prove socially very useful.

In France, each employer of labour is obliged to pay into a "Caisse de Compensation" a premium based on the number of persons in his employ, regardless of the number of children these employees may have. The Caisse de Compensation then pays to each family a standard benefit calculated on the size of the family. This is the legal obligation of the Caisse, but, if funds are sufficient, there is no prohibition to carry on other activities. As a result, many Caisses undertake various subsidiary activities, such as the operation of dispensaries, of summer camps, of courses in domestic science, and of general social services and of industrial health and welfare services. It perhaps should be explained that these Caisses de Compensation are governed by the employees who are members of the Caisses and who select Administrative Committees to direct them.

Many of the collective industrial health services which have been organized in France have been started by Caisses de Compensation. A typical one is the Centre Médico-Social Inter-Entreprises du XI arrondissement, 168, rue de la Roquette, Paris. The organization and activities of this centre can be described briefly as follows:

Lay out: The Centre consists of waiting-room, office for medical social worker, consulting and examining room for physician, two small dressing rooms, a room for fluoroscopy and a laboratory.

Activities: A compulsory pre-employment examination with chest radioscopy, urinalysis but no Wassermann. An annual examination (non obligatory). Special three-monthly examination of young persons (14 to 20 years) with radioscopy and Mantoux test; monthly weighing in the factories. (Those who show a change in tuberculin reaction from negative to positive are given 4 to 6 weeks' leave and paid the usual insurance benefit). Examination of all those returning to work after sickness. Consultations for those employees who request them. Visits to factories by medical social worker. A minimum of treatment, no home visits. The program of health education has not yet been developed partly due to difficulties associated with the war.

Personnel: One physician full time; one social worker full time; one secretary full time; one to two social workers in training.

Records: Records are kept on suitable forms of pre-employment and periodic examinations and of consultations, and a tally of visits by day and by month is kept and tabulated for each plant.

Cost: The actual cost of the service is said to be at present about 150 francs per employee per year. At present, the charge to plants is only 100 francs. The initial cost was covered by the Caisse de Compensation, and it is believed that the annual charge will in future be adjusted to meet the cost.

The number of workers covered by the service is about 3,000.

PENSION SCHEME FOR ONTARIO DOCTORS*

By B. C. Hardiman, B.A., M.D., C.M., M.R.C.S.(Eng.), L.R.C.P.(Lond.), LL.B.

Fort William, Ontario

A pension scheme for doctors between the ages of 60 and 70 years may sound somewhat fantastic. But in these days when social security is in everyone's mind, it is simply

*Presented at the Annual Meeting of Thunder Bay Branch of the Ontario Medical Association, September 1945.

a progressive step in medical economics. When we consider that it is the policy of all governments and employers of labour to provide a pension fund for their employees and that the employees of our own Medical Association have such a scheme, it is a challenge to our profession that a pension plan should be put into force as soon as possible. To my knowledge no doctor at the head of the lakes has been able to provide a pension for his retirement at 60 years of age. The total number of physicians in Ontario is 5,500; 1,800 on military service, 3,400 in active practice.

My interest is such a scheme for doctors was first aroused during my tenure of office on the Fort William Council, when after ten years of discussion, a by-law was passed on November 28, 1944, providing for a contributive pension scheme for all employees from 55 to 70 years of age. After reviewing this by-law, the Canadian Government Annuities, the Canada Car Allowance Plan, and the Canadian Hospital Pension Plan I am of the opinion that a pension plan for doctors in good standing in the O.M.A. is not out of place. I would therefore suggest the following brief outline:

That after due consideration by the committee of the Ontario Medical Association appointed for this purpose and with the assistance of the Canadian Government Annuities Department, Ottawa, a circular letter outlining the following be sent to all doctors practising in Ontario. (1) That in order to provide a pension plan for doctors in Ontario they voluntarily add $60.00 per year to their Association fee. (2) That this amount supplemented by a grant from the O.M.A. and interested organizations such as life insurance companies be a nucleus of such a fund for this purpose. (3) That the amount of pension be graded according to age and amount contributed and that the maximum pension be $100.00 per month for life. (4) That every participant must give proof of his age and must designate his beneficiary as the contract provided. (5) That this plan be not operative until at least two years have elapsed from the time of acceptance.

The advantages of such a plan are, that it is strictly a medical doctors' plan, and that it will have the whole Dominion behind it. It is payable for life. It is not transferable. It cannot be lost or stolen. It cannot be forfeited. It cannot be seized upon by any law or court. No medical examination will be required. Any member of the O.M.A. in good standing will be able to participate. There will be no doctor dependent on charity, and all who participate will be independent. It will increase the membership of the O.M.A. to probably 100%. If payments fall into arrears, participants do not lose their money. Should the purchaser die before the pension becomes due all the money the purchaser has paid plus 4% interest will be returned to his designated beneficiary.

A Protest Against Heavy Taxation of Medical Profession in South Africa

[The following extracts are from a memorandum presented before a meeting of the Northern Transvaal Branch of the Medical Association of South Africa on July 24, 1945, by Dr. B. P. Jubbe. How far the suggestions therein made have been acted on, if at all, is not yet apparent. But it is of interest to observe both the conditions of taxation mentioned, and the reaction thereto.—EDITOR.]

It would appear, judging by the exorbitant taxation, that the Minister of Finance and the Cabinet regard medical practice as not being an essential service but superfluous, useful only as a taxable entity. Not the slightest consideration is extended to us for yeoman service rendered during all hours of the day and night, and the particular responsibilities that we have to bear in exercising our duties are not given the slightest consideration or recognition. We are classed and taxed as a "trade", while we enjoy neither working hours from 9 to 5, nor half-days, holidays or Sundays; and medical ethics debar us from even forming a trades union.

I need not dwell on the expense of a medical education and the lean years of housemanship and assistantship that follow. Now these hazards having been surmounted, most of us find that we are not even in a position to provide for our dependants, having to save in order to meet the Income Tax and Excess Profits Duty. We of the younger section, therefore, dare not aspire to further degrees for our own betterment, or to specialize, since we are not in a position to make financial provision for postgraduate study; and even if we did specialize, there still remains a mere basic income of £1,500—the highest valuation for skilled professional service.

These hardships were very patiently borne during the war years, despite the fact that South Africa happens to be the only country in the world where Excess Profits Duty is extorted from the medical profession; but with the cessation of hostilities in Europe we at least expected some relief. On the contrary, however, we are now more heavily taxed than ever, since even salaries representing specially reduced contract fees are included in assessing Excess Profits Duty! We are now told that salaries of medical practitioners were originally intended to be included in determining Excess Profits Duty, and that we should consider ourselves most fortunate in that our salaries have been exempt ever since 1940, due to certain legal technicalities.

We know that the trade proper—the business firms—are being refunded the Excess Profits Duty previously paid; and that it is possible for the trade to obtain a refund of the whole amount paid in Excess Profits Duty while a deficit is shown on the 1939 standard. To the trade, therefore, the sum paid in Excess Profits Duty is in effect a reserve fund which can and is being utilized to improve premises, to advertise, and to subsidize the sale of goods at cost

or below cost for the purpose of attracting custom. Does it not seem that herein lies the reason for the sudden inclusion of salaries for Excess Profits Duty taxation, since salaries have no way of escape and must make good the E.P.D. loss thus suffered by the Revenue Department?

This unfair taxation is doubly hard on those members of the profession who enlisted, some straight from the Universities and others who sacrificed their practices; these men who now considerably older in years and experience, are confronted with heavy capital expenditure in having to purchase a share in a practice, a house, a car, etc., with the prospect of earning at most £1,500.

Now, we are informed that the Federal Council interviewed the Minister of Finance on three occasions, and while I do not belittle the efforts made, I hold that Federal Council displayed a lack of initiative, since it submitted to the Minister's adamant refusals to grant relief, and failed to devise and promulgate counter measures; moreover, Federal Council omitted to keep the profession informed with regard to these interviews.

I realize that the measures I am about to suggest will be considered revolutionary by some of us, but need I remind you that the taxation is ultra-revolutionary? In fact, it amounts to confiscation of one's income—at least, such is the plight of the unfortunates who, by the grace of the Gods, were not blessed with a high 1939 standard.

While I dislike referring to the unjust inequality of taxation, I feel certain that, had the senior members of the profession and Federal Council been subjected to the same drastic taxation, their protestations would have been more vehement and their action would have been more purposive; and perhaps the Minister would have been less autocratic. It is incredible that an influential and powerful body such as the Medical Association would have been so completely ignored if the profession had shown a united front and had taken strong action. Is it not the moral obligation of Federal Council to take drastic action to bring relief to the large majority of the profession who, on an income of £2,000 and £3,000 respectively, must pay the atrocious tax of £450 and £1,170 respectively? In contrast to this, the fortunate ones who in 1939 had an income of £2,000 and £3,000 respectively pay only £150 and £387 respectively! When we reflect that the official figures of the rise of cost of living for Pretoria published today amount to no less than 39.2% above those of 1938, it is clear that the basic income of £1,500 is actually reduced to a mere £900.

That this plight is of no concern to the Minister of Finance is only too plain, and that he apparently has no conception of the extent of our duties is obvious. On 3/5/45 the Minister stated to a deputation of the Parliamentary Committee that he could see little difference between the free services of accountants and medical practitioners.

I therefore propose that this Branch strongly urges Federal Council to notify the Minister of Finance at an early date that, as a direct result of the victimizing taxation of the medical profession, the following measures will be adopted by the Medical Association, regard being had to the fact that the medical profession has refrained from raising fees during the whole war period, and the freedom of the profession in England from Excess Profits Duty taxation.

(*a*) All professional fees be doubled.

(*b*) Fees for night services be trebled.

(*c*) Since we are taxed as a "trade", the profession will serve the public from 9 to 5 on weekdays and 9 to 1 on Saturdays, Sundays and Public Holidays excluded. Exception will be made in emergencies only.

(*d*) As from a date to be fixed by Federal Council all medical practitioners in receipt of part-time salaries be instructed to cease work.

The public to be advised of the change a reasonable period in advance by the Medical Association through the Press.

Men and Books

MEDICINE IN MONTREAL IN THE 'NINETIES*

By A. H. Gordon, M.D.

Montreal

Medicine in Montreal in the nineties was not one microcosm, as the title might imply, but two almost completely separated units—separated by language, by distance, to a large extent by religions, and also by the sources of their medical inspiration. The French School received its inspiration from Paris, the English School from London, Edinburgh and Dublin.

Laval University in the 'nineties was on St. Denis Street below St. Catherine, while McGill was just below the mountain; but l'Hôpital Notre Dame was on Notre Dame Street, east of Place d'Armes, not far removed from the Montreal General Hospital on Dorchester Street, while l'Hôtel Dieu near Fletcher's Field was only a short distance from the Royal Victoria Hospital on Pine Avenue, but this proximity resulted in an amicable acquaintance rather than a close association.

What I have to say today deals largely with personal recollections which refer chiefly to the teaching of medicine at McGill University and

*Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Montreal, P.Q., June, 1945.

its associated hospitals, but by changing the language and the name, it might equally well refer to the history of French Canadian Medicine over the same period.

To be able to look back fifty years to one's entry upon the study of medicine is a dubious privilege, but one cannot cheat the clock nor the calendar, and I have to confess that I came to Montreal as a first-year student in medicine at McGill University in September, 1895, and there may be something to be gained by setting side by side the days that were and the days that are.

Our class numbered a few over one hundred, and we were the second class to enter upon a course of four sessions of nine months each.

A recent addition had been made to the Medical building, and in this new building there was a very large lecture room and the laboratories of pathology, physiology and histology. This building was destroyed by fire in 1907 and the present Medical building succeeded it.

The Royal Victoria Hospital had been opened in 1893, and in our time consisted of the central section and the two turreted wings; and the George W. Campbell Memorial wing of the Montreal General Hospital, which housed the surgical department, had also been recently completed, so that we felt ourselves, as medical students, to be citizens of no mean city.

Of the students entering Medicine in 1895 there were 100 Canadians, 7 from the United States, one from Great Britain and one from Newfoundland, and there were no women students.

It is of interest to compare the most recent class entering almost 50 years later. There are 90 Canadians, 25 from the United States, and six from the British West Indies. In this class there are 12 women students.

The City of Montreal of fifty years ago lay between the mountain and the river.

Students lived in those days within walking distance of the university, and at least 75% of them were in boarding-houses between Sherbrooke and Cathcart Streets, and between Metcalfe Street and Union Avenue. Victoria Street within this area rejoiced in the name of "Bedbug Alley".

The only asphalt pavements were on two blocks of Union Avenue, on a short stretch of Dorchester Street—the fashionable English section—and on a similar portion of St. Denis Street which was the corresponding French Canadian district. The rest of the city's streets were macadamized, deep in dust in summer, and even deeper in snow in winter, with wooden sidewalks on the main streets, and no wooden sidewalks on the more modest thoroughfares.

In winter each householder cleared the sidewalk in front of his home according to his lights, and piled the snow where the gutters were, and after a heavy snow storm, the pedestrians on one side of the street were invisible to those on the other side, and even the fur-covered sleighs and fur-capped footmen and drivers might be unseen from the sidewalk on Sherbrooke Street as their sleigh bells tinkled along the middle of the road.

Two students in a double room on Mansfield Street or Cathcart Street would pay from $14.00 to $18.00 a month each for their room and board. Some at times would make a vulgar display of wealth by going to Beau's Café or Alexander's on St. Catherine Street and paying 25c for a single meal of three courses.

Street cars ran along St. Catherine Street to Greene Avenue and back to Windsor Street, and down Windsor Street to St. James Street and up St. Lawrence, but shanks mare took us on our lawful occasions even on the trek from the University to the Montreal General Hospital and back again.

Westmount—then called Côte St. Antoine—was just emerging, but only bold spirits dwelt that far out.

Montreal in 1895 with all its suburbs had a population of 318,000 as compared with 1,200,000 in 1944. The street cars in that year ran from Place d'Armes 2¾ miles west, 3¾ miles east, and 3¼ miles north, while last year they ran 9 miles west, 13 miles east and 7½ miles north, and at that time the street railway had 79 miles of track and it now has 379 miles.

"Clinical Medicine", by which is meant the study of the patient at his bedside, as distinguished from the study of his body fluids and his secretions and excretions in a laboratory, reached its high, perhaps its highest point in the time of Howard Senior, Osler and George Ross in Medicine, and of Fenwick, Roddick and Shepherd in Surgery. These men flourished in the eighties, and their successors and students, Stewart, Finley and Lafleur in Medicine, with Armstrong, Bell, Hutchison and Elder in Surgery were here in the nineties, while Shepherd continued his activities through both decades.

It was these men and their assistants who were our clinical teachers, while in the specialties there were Buller, Birkett and the two Gardners, and each one of them could say "I knew Osler". It was a true Apostolic succession in Medicine in its broad sense. These men were our teachers, to be listened to, joked about, laughed at and nicknamed, even as you and I have been, but it required the perspective of years to make us realize that "there were giants upon the earth in those days".

What were we taught? In the first and second years we were taught anatomy, by lectures every morning at 9 o'clock—and that meant 9 o'clock—and by dissection for the rest of the forenoon and in any off hours later in the day, taught it in grinds, by drawings, by reading Gray's Anatomy and Cunningham's Dissector, and perhaps most of all by the fear of Francis J. Shepherd, whose blue-grey eyes and

curt reproof could bring sweat to the face of the toughest, and provoke visceral peristalsis in all others. No man passed from his second year until he knew his anatomy, and all of the senior chronics were still undergraduates because they hadn't passed their anatomy.

The other subjects of the primary years were as excrescences upon the basic subject of anatomy, though actually they had places of equal importance in the curriculum. A student was made or marred in his first two years by his knowledge of anatomy and a McGill student became known everywhere as one who knew his anatomy. Anatomy may have been, as teachers in other departments called it—"A soul-benumbing subject", but it made good doctors, though perhaps its teaching resembled too much the recipe for military training, "Ammer im—Ammer im—Ammer im; if he lives e'll be a soldier".

Physiology was taught by Professor Wesley Mills, a Master of Arts and a frequent visitor to Europe's medical centres, and the author of a textbook on physiology known as "our larger book", but the common or garden medical student was outside his ken, and so was the method by which he could be taught physiology, and what we learned, we learned from his assistants and from Foster's Physiology, one of the pillars of a medical training in those days.

Dr. Gilbert Girdwood was the Professor of Chemistry—the typical professor—rotund, bewhiskered and bespectacled, a man of great learning in his subject, and I well remember the thrill we received when in 1896 he showed us the bones in his hand by Roentgen's miracle ray.

It is worth noting that the first recorded employment of the x-ray in surgical diagnosis was upon a case under the care of Dr. Kirkpatrick at the Montreal General Hospital. He was sent to the Physics building where Prof. John Cox located a bullet in his leg which was removed by Dr. Kirkpatrick in February, 1896. This case was reported in the *Montreal Medical Journal* of March, 1896.

The subject that straddled the primary and the clinical years was materia medica and therapeutics. It was taught by Dr. A. D. Blackader. His lectures were precise, detailed and complete, just as the lecturer himself was punctual, patient and persistent, and the student who attended all his lectures and wrote down verbatim what the lecturer said, might get writer's cramp, but he also got an up-to-date textbook on therapeutics with which he need fear no examiner. No relic of my student days do I value more than the notes which I took from Dr. Blackader. In looking over this notebook, one notices that 5% of the space was given to opium, and an equal amount each to mercury, iron, belladonna and strychnine, but it appears that an equal space was also given to the group of vegetable aromatics, which included mint, sumbul, valerian, ammoniacum, myrrh and camphor. Emetics trailed these groups, but purgatives distanced them all with about 10% of the total space. They may not all have been useful, and some were useless or worse, but at least the intern of those days was not restricted to a choice between A.B.S. & C. and magnolax. We lived then in an age of digestive ferments, and pepsin and pancreatin were highly regarded in the therapeutics of the digestive tract.

The vitamin fixation had not become universal, and though cod liver oil was often employed it was not given in the spirit of worship which now provides a halo for "bottled sunshine". Arsphenamine 606 had not been drawn from the void, and lues was treated by mercury with chalk, or mercurial inunctions, or with potassium iodide.

An interesting sidelight is cast by a section of these notes devoted to "alteratives" which were defined as "drugs which so alter the nutrition of the tissues as to modify and tend to improve either faulty nutrition or disease existing in them". Included in this group are arsenic, iodine, mercury, gold, colchicum and sarsaparilla. This paragraph might find its parallel in the glowing words used by political leaders to describe their several parties in the present day. The reference to gold and sarsaparilla increases the resemblance.

Just here may I pause to comment upon the laborious life of our teachers. In the days of few telephones and no motor cars, Dr. Blackader lectured throughout the session on therapeutics, and on diseases of children; he was, in the summer-time, the senior attending physician of the Montreal General Hospital; he was the consultant in children's diseases for the whole city, and had as well a large general medical practice. He was an active member of, and a frequent contributor to the program of the Canadian Medical Association, the Association of American Physicians, the Climatological Association and the American Pædiatric Society, and in his later years he was the editor of the *Canadian Medical Association Journal;* and while never robust, he lived on into the eighties and continued his work almost up to the day of his death.

During the same period Dr. Shepherd lectured on anatomy for five mornings a week and was director of the anatomical laboratory, and in the spring session gave a course in surgical anatomy, was senior surgeon in the summer to the Montreal General Hospital, and did all the operating on his service with the assistance of one house surgeon, who did all the dressings. He held a clinic in dermatology once a week, and incidentally, was a consultant in surgery for all of Canada, and to fill in his spare time, was president of the Art Association of Montreal and a noted connoisseur. I often wonder what stuff was put into the men of that generation.

In 1897 and 1898 we came under an unusual group of clinical teachers. James Stewart was

Professor of Medicine. He was slow of gait and slow of speech. He had no graces of face or form. He didn't know what to do with his hands or his feet. He said little, but his grunt was more informing than many lectures, and his instinct in medicine was impressive, and his pithy sayings one could not forget; such as "The first aim of treatment is to prevent death", or "You may give him potassium iodide, it will do no hurt"; or to a student whose speech outran his knowledge—"The less you say, the less you'll have to take back again". Associated with him was an "all star cast"—F. G. Finley, and H. A. Lafleur at the Montreal General Hospital, and C. F. Martin and W. F. Hamilton at the Royal Victoria. All four of these were active long after the age of retirement from teaching, and Dr. Martin and Dr. Hamilton are with us still, to our great happiness and profit. These men were all in the direct succession from the "Palmer Howard, Ross, Osler" school of objective clinical medicine, and were not "the first to cast the old aside, nor yet the last by whom the new was tried".

This mental attitude toward medicine made easier the assimilation of the newer chemistry and the newer physics, out of which grew the intensive study of metabolism and the new cardiology and radiology, all of which are growing so big that they bid fair to forget the pit from which they were digged.

Surgery in the 'nineties was a giant who had waked up, and with Lister, had broken his fetters, but was still rubbing his eyes and had not yet learned his own strength.

Roddick had brought a Lister's carbolic spray to the Montreal General Hospital in 1877 and the antiseptic era was under way, but the modern aseptic technique was still far in the distance. Surgeons still operated with their bare hands, and rubber gloves only became general about 1900, but by no means universal. The hand toilet was a long scrub with a brush and soap and hot water, then immersion of the hands and arms in permanganate solution, then in oxalic acid solution, then in alcoholic solution of mercury bichloride. The patient's skin received the same treatment, and frequently his operation wound was healed before he was cured of his chemical dermatitis. Masks for the surgeon's face and sterile foot coverings were unknown.

The type of cases which came to operation in 1895 gives an idea of the surgical trends of that time. In a hospital population in the Montreal General Hospital in that year of 2,436, there were 448 operations in general surgery, and 118 in gynæcology. There were 35 appendectomies, 2 cholecystotomies, 7 cases of intestinal obstruction, 17 amputations, 35 incisions of glands, of which 28 were inguinal and 6 cervical, 1 perforation of a gastric ulcer, 2 typhoid perforations, 8 operations for cancer of the breast, 7 resections of the ribs for empyema, 23 operations for hæmorrhoids, 17 skin graftings and 15 herniotomies, of which 4 were for strangulated hernia. In the gynæcological service there were 53 oöphorectomies and 4 hysterectomies. One notes the absence of operations on the stomach or resections of bowel, or removal of the gall bladder. There were no operations upon the central nervous system, no nephrectomies and no prostatectomy.

Obstetrics was taught us in the late 'nineties by Dr. J. C. Cameron, a gentleman and a scholar, who used the English language well, and whose word pictures still linger in one's memory, but our practical and clinical training was of the scantest.

The old Maternity Hospital was on St. Urbain Street below Dorchester, and my clinical experience consisted of watching, with five classmates, the resident deliver six normal babies, affairs in which we had no hand, and it was little wonder that I approached my first obstetrical case in a mining town of British Columbia with some trepidation, but nature was kind.

In this day and age, when the man in the street, as well as the woman at the tea party, speaks freely of coronary thrombosis, so freely that some call it "a cornery" and others "trombosis", it staggers us somewhat to recall that no such diagnosis was made in the 'nineties, and that the first clinical diagnosis of the condition was made by Dr. J. H. Herrick of Chicago in 1912.

It is true also that carcinoma of the lung, now rarely absent from the men's medical ward, was also unrecognized in the 'nineties and later. On the other hand, amyloid disease, now a rare condition in our hospitals, was rarely absent from surgical wards in the 'nineties as a sequel to the numerous cases of bone tuberculosis and chronic osteomyelitis which always occupied a sizable proportion of surgical beds.

Inguinal adenitis as a sequel to chancroid was never absent from the surgical wards, and these cases were the intern's introduction to operative surgery, and their later daily dressings were his plague. My surgical friends tell me that these cases are no longer seen.

Tuberculous glands of the neck were also frequent customers then, but a rarity now. One shivers when he thinks of the almost invariable presence of cases of open tuberculosis in both medical and surgical wards in the 'nineties, and we also recall the considerable number of interns and nurses who developed tuberculosis during their hospital residence.

It is difficult for us in this year of grace 1945 when we see a patient admitted with pneumonia, put to bed, given a sulfonamide or penicillin, a sedative, and a good prognosis, to visualize the patient with pneumonia in 1898, and to realize that 50% received strychnine, 35% received whiskey, all got some expectorant, none received morphine or any sedative except a linctus of codeine, two-thirds had linseed

poultices to the chest, and one-third had ice bags, most received calomel and soda as an overture, and 30% died; and lest the surgeons present should jeer at the needless medication, I quote from my notes of Sir Thomas Roddick's lectures on surgery in 1897 the following paragraph on the treatment of erysipelas:

"Tr. ferri mur. 15 – 40 m. doses. For temperature quinine may be added. Sod. salicylat. as a specific has given good results. Quinine c antipyrin or cold baths for temperature. Pilocarpine gr. 1/6 may abort the disease. Camphor gr. i hypodermically is a useful stimulant, as is ether hypodermically, while injection of carbolic 1 – 10 around the blush, or strong solution of iodine around the patch, may abort the disease."

It would be difficult to estimate the influence upon medicine in Montreal and this continent of two figures who were our teachers in the 'nineties, but who were not clinicians, but pathologists. One was short, plump and dapper, trained in physiology at Cambridge, and with a Cambridge accent that was a part of himself, whose lectures were a treat both in matter and in manner. By him, J. George Adami, we were soundly taught the fundamentals of pathology. The other, Wyatt Johnson, a true disciple of Osler, was as tall and lank and dishevelled as Adami was the opposite. For him, the world didn't exist when his brilliant mind was in pursuit of an idea, like a comet blazing its way through space. To these two unlike men none of us realize how much we owe.

The major plagues in Montreal in the 'nineties were tuberculosis, intestinal infections in children, typhoid fever and diphtheria, and a comparison of these figures in 1895 and 1944 are revealing. The resident population in Montreal proper under the supervision of the Municipal Health Board was in 1895—237,100, while in 1944 it was 972,000. The death rates for these two periods compared per 100,000 were:—

	1895	*1944*
Tuberculosis	235.6	61.8
Intestinal diseases of infancy	467.7	34.3
Typhoid fever	18.6	0.9
Diphtheria	176.3	2.8
Smallpox	0.0	0.0

We must remember that the great epidemic of smallpox described by Osler, in which over 3,000 people died, occurred in 1885, since when vaccination against smallpox had been total in Montreal.

While acting as intern in medicine to Dr. Finley in 1899, I recall several occasions on which there were no cases in the ward for clinic except typhoid fever; but the mortality of about 10% was as nothing to the slaughter of the innocents in the summer epidemics of intestinal infection among babies.

We who now take chlorination, pasteurization and refrigeration for granted, should not forget that each one of these life-saving measures came up the hard way through ignorance, through medical and municipal "laissez faire", and through entrenched commercial cupidity, and now at the end of the road, we salute our pædiatric friends as those who have been the greatest life savers in the medical community.

It may be of interest to remember that we of the 'nineties, who took our "fin de siècle" in medicine and surgery very seriously, had horse-drawn ambulances; the surgeons didn't wear gloves; anæsthesia was a choice between chloroform and ether; infiltration anæsthesia and spinal anæsthesia were unknown; lumbar puncture was a curiosity; veins were never entered by needles either to collect specimens or to give fluids for medication; transfusions of blood were not given; bronchoscopy, œsophagoscopy and cystoscopy were not done; the basal metabolic rate had not been heard of; thyroid surgery only concerned cysts and tumours; the so-called "toxic goitres" were then "medical" and not "surgical" diseases; preoperative treatment of surgical cases was by starvation, purgation and dehydration, but not sedation; insulin for diabetes, and liver therapy for pernicious anæmia were not even imagined; the blood pressure instrument had not been invented; a department of metabolism in a hospital had not been conceived; women students in medicine were unknown at McGill; interns did all the blood counts and clinical chemistry, and there were no young women technicians. If there were married interns they were known only to themselves and their consorts. A request for a week-end holiday by an intern would have resulted in a court martial, and the intern's hours of duty were like the sailor's—"six days shalt thou work and do all that thou art able, on the seventh holystone the deck and scrape the cable". But in spite of the things doctors didn't have, they had their five senses and the wits which the Lord gave them, and by using these they were by no means helpless.

People in the 'nineties didn't enter hospital lightly. In 1895 there were 2,416 admissions to the Montreal General Hospital, and in 1944 there were 12,539; and at the Royal Victoria there were 1,841 admitted in 1895 and 18,256 in 1944.

In 1899 there were thirteen rooms for private patients at the Montreal General Hospital, and at that time if one required a special nurse it would cost him $2.50 a day, and for that remuneration his nurse would work only nineteen hours.

It is trite to say that great changes and some improvements have taken place in medicine since the 'nineties, and I hope that when I address this gathering fifty years hence, we will all realize that more changes and even greater improvements will be there to encourage us.

1414 Drummond St.

Divisions of the Association

Alberta Division

The annual convention of the Alberta Division of the Canadian Medical Association was very successful this year; 201 doctors were registered, of whom 93 were from points outside of Calgary. In addition to the good registration of doctors, there were more visiting doctors' wives than at any provincial convention in many years. The Alberta members of the profession were greatly pleased with the help they received from the visiting men of the East, Drs. Léon Gérin-Lajoie, John Hepburn, H. G. Pretty, W. G. Cosbie, and T. C. Routley. A symposium was held by men who had seen service over-seas, the subject was "Traumatic surgery". Those who took part in this symposium were Lieut. Col. J. W. Bridge, Major F. W. Grauer, Major J. S. Gardner, and Squadron Leader D. M. Bruser.

The banquet also was well attended, and the high-light was an address by Rev. Dean Smye of Calgary.

Prince Edward Island Division

The annual meeting of the Prince Edward Island Medical Society, Prince Edward Island Division of the Canadian Medical Association, was held on Saturday, October 6, 1945, at the Charlottetown Hotel, Charlottetown.

Forty doctors representing all sections of the province were in attendance. Those present were quite enthusiastic with the day's proceedings. The morning session was devoted to business. Following luncheon the president of the Canadian Medical Association, Dr. Léon Gérin-Lajoie, gave an address which was widely praised for its call to forebearance and tolerance in making this a united Canada. He stressed the great strides the medical profession has made in science and unity, and it is for them to show leadership in the new developments that are occurring in medical economics. He spoke for personal freedom, for the uniting of our efforts in one body—The Canadian Medical Association.

"It is not for us to forget," the president stated, "that the more power that the rulers have the less power the people have."

Dr. T. C. Routley, General Secretary of the Canadian Medical Association in his factual, poised and diplomatic manner gave a challenge to us as practising physicians, to be on the alert to safeguard, not only our interests, but the interests of the public in matters pertaining to the proposed health reforms being formulated in health insurance. He reminded us that during this war the Canadian Medical Association grew, not only in strength and stature, but also in prestige and influence, which has expanded the length and breadth of our land; that we are not divided but are 9 divisions strong, 9,000 in numbers, a 90% membership.

In the afternoon the clinical session was most instructive and interesting, the participants receiving well deserved words of praise for their presentations.

THE PROGRAM

1. Consideration of two cases of amenorrhœa, Dr. Léon Gérin-Lajoie, Montreal, President of the Canadian Medical Association.

2. The surgical approach to peptic ulcer, Dr. Gavin Miller, surgeon, Montreal.

3. Bronchogenic carcinoma, a malevolent impostor, Dr. C. N. Pierce, radiologist, Cancer Society, Montreal.

4. The remote effects of anti-convulsive therapy with de-phenyl hydantoinate of sodium, Dr. G. A. Gauthier, neurologist, Quebec.

The officers and committees of our Society for the coming year are the same as for the preceding years, being unanimously re-elected, namely: *President*—Dr. L. T. Farmer, Mt. Stewart; *Vice-presidents*: Kings County—Dr. R. J. MacDonald, St. Peter's Bay; Queens County—Dr. Eric Found, Charlottetown; Prince County—Dr. A. R. Grant, Summerside; *Secretary*—Dr. A. J. Murchison, Charlottetown; *Treasurer*—Dr. I. J. Yeo, Charlottetown.

A. J. MURCHISON

Medical Societies

Prince Edward Island Medical Association

The Prince Edward Island Medical Association held a quarterly dinner at the Charlottetown Hotel, sponsored by the Educational Committee, on August 23. The President, Dr. T. Leonard Farmer, Mt. Stewart, presided. The guest speaker was Lieut.-Col. Donald Campbell, prominent Charlottetown surgeon, who has recently returned from overseas duty where he was Surgeon-in-Chief of No. 7 Canadian General Hospital.

Dr. Campbell, in a vivid and interesting manner, gave a running description of his experiences from the time he was stationed at Debert Military Camp, Nova Scotia, until he returned to Canada, which included time spent in England, France and Germany. In his remarks Dr. Campbell paid a high tribute to the Island doctors and nurses who served under him, and also expressed his sincere gratitude for the facilities provided in Canadian hospitals by the Canadian Red Cross. Dr. W. J. P. MacMillan moved a hearty vote of thanks to Dr. Campbell, and Dr. John MacNeill, of Summerside, seconded the motion which was endorsed by all present. The three Counties were well represented by doctors from all districts.

Correspondence

Non-Specific Urethritis

To the Editor:

The column "V.D.—Briefs" appearing in the *C.M.A.J.* is felt to fill a long needed want in presenting up-to-date venereal disease facts to Canadian medicine.

However, there would appear to be a tendency in the July and August numbers to consider so-called non-specific urethritis in a negative way, *i.e.*, if no gonococci are found then the urethritis is of little concern to both the patient and the doctor.

It is admitted that little is definitely known as to the causation, the cure, the possible complications and the transmissibility of the disease from one sex to the other. This magnifies its importance rather than minimizes it because the doctor is unable to make positive statements to the patient.

Service experience has shown it to be far more troublesome than gonorrhœa. It is becoming increasingly apparent that it is a disease in its own right: it would appear to be acquired during sexual intercourse; its incubation period is longer than that of gonorrhœa; its course is not affected by penicillin; the results of sulfa therapy are disappointing; it causes more lost work-time than gonorrhœa and its transmissibility is difficult to assess.

Unfortunately many Service personnel breathe a sigh of relief when a discharge is called N.S.U. It is felt that this sigh should be reserved for those diagnosed as gonorrhœa as this is much easier to treat and its prognosis much easier to state.

G. R. F. ELLIOT,
Squadron Leader.

H. P. LYON,
Squadron Leader.

R.C.A.F.,
Overseas Headquarters,
September 3, 1945.

Special Correspondence

The London Letter

(From our own correspondent)

HEALTH SERVICE

Since last month's letter, which recorded an unfortunately-phrased attack in Parliament on the late Minister of Health and the British Medical Association, the new Minister has made his first public speech since appointment. It was a clever speech and has already improved the atmosphere. Particularly pleasing was his reference to the importance of doctors, as a profession, having what he termed "a greater and greater say in the management of their own services". It meets one of the main fears of being "run" by bureaucrats and if fully implemented in administrative machinery will make the return to the White Paper, mentioned last month, well worth while.

Another statement by Mr. Bevan was about the necessity for experiment. This has been elaborated by *The Lancet* into a plea for the urgent necessity of experimenting with health centres. This aspect of a health service, introduced long ago into some of the earliest plans, has been one of the most universally agreed upon by all concerned. The lay press is enthusiastic. Recent articles have stressed the advantages of such matters as team work, adequate clerical help and, perhaps an almost over-looked aspect, the relief afforded to the doctor's wife!

But no one yet knows what is the best type of building or of organization; or the size of an area to be served; or the number of doctors; or their method of payment. It is urged that a small central expert body be set up without delay to see that experiments are started. By trial and error—even if costly on a small scale—much will be learned, and by the time the new building is possible and the medical profession numerically strong enough a really national scheme of health centres can be achieved.

DEMOBILIZATION

While civilian doctors may discuss the new Minister, the only topic in Service quarters is still demobilization. Correspondence in lay and medical press, private letters and conversation, all tell the same tale of underwork and discontent. Recent announcements have done little to dispel the general gloom and one letter states that "the neurosis in Service doctors is appalling". The Air Force is to continue the same ratio of doctors to other ranks as during the war (2.3 per 1,000 compared with an estimate of 0.7 per 1,000 in civilian life). The Army has recently indicated that special groups of officers (which appears to include doctors) will not ever get out with their corresponding groups. The Navy said much the same thing a little earlier. Some of the younger men have been unofficially warned of three or four more years before demobilization.

Perhaps when Parliament meets again, some statement will be made on the whole question as it affects doctors and others. Meanwhile, recruitment still continues and steps are being taken to see that permanent medical appointments are only filled after every effort has been made to give a fair chance to all those still in the Services.

WOMEN IN KHAKI

It was the results of medical examination of recruits that many years ago started some of the efforts to improve the national health. Results this time have been generally better but it came as a shock to learn that over half

of the entrants to the chief women's Service had some deformity or anomaly of the foot, and a quarter had disability enough to justify treatment.

Two groups of trouble were recognized: deformities such as clawed toes and bunions, caused mainly by faulty foot-wear in adolescence, and long-arch disabilities caused by faulty posture, poor nutrition, insufficient rest after illness and other social causes. Prevention by more careful shoe fitting, simple remedial exercises, education by film and "precept", seems to be called for. At the other end, so to speak, it is reported that there was a high incidence of head-lice among recruits fresh from civil life, but easily controlled by modern methods.

In general women have stood the test of Service conditions very well, especially when it is remembered that in the British Army the general rule has been that one woman replaces one man in most jobs.

NEW REGIUS AT CAMBRIDGE

The "regius chair of physic" at Cambridge has been filled in an imaginative manner by the appointment of Sir Lionel Whitby, well known for his work on blood, and the sulfonamides. It is a departure in keeping with modern trends to have a clinical pathologist instead of an orthodox physician in this important post. A new spirit will no doubt soon make its appearance at the Cambridge school of medicine.

ALAN MONCRIEFF.

London, October, 1945.

University Notes

The registration of service men in the various medical faculties throughout Canada for this year has been reported as follows:

UNIVERSITY OF ALBERTA

There is a fixed quota of 40 for the First Year in this University. This has been entirely filled this year and includes six returned men.

There has been a heavy entrance of veterans in the pre-medical (B.Sc.M.D.) years, about 45 in all.

DALHOUSIE UNIVERSITY

First Year—Total registration 52, of whom 7 are service personnel. *Second Year*—50 students, of whom 6 are service personnel. *Third Year*—36 students, none of whom are service personnel.

MCGILL UNIVERSITY

First Year—Total registration 117, of whom 34 are servicemen. *Second Year*—Includes 8 servicemen. No servicemen in the other years.

UNIVERSITY OF MANITOBA

First Year—Registered 61, ex-service 18; *Second Year*—Registered 60, ex-service 5; *Third Year*—Registered 64, ex-service 1; *Fifth Year*—Registered 62, ex-service 1.

QUEEN'S UNIVERSITY

First Year—Registered 60, ex-service 51; *Second Year*—Registered 50, ex-service 13; *Third Year*—Registered 46, ex-service 2; *Fifth Year*—Registered 44, ex-service 1; *Sixth Year*—Registered 40, ex-service 0.

UNIVERSITY OF TORONTO

Year	*Number registered*	*Number ex-service men*
First premedical	150	...
First ex-service	156	156 (1 woman)
First medical	171	25
Second medical	122	10
Third medical	129	..
Sixth	139	..
	867	191
Diploma in Public Health	33	23
Diploma in Industrial Hygiene	1	1
Diploma in Radiology	4	3
Diploma in Psychiatry	1	1
	39	28
Total	906	219

UNIVERSITY OF WESTERN ONTARIO

Second year—64; *Third year*—40; *Fourth year*—35; *Fifth year*—38.

McGill University

REFRESHER COURSE

The following communication has been received by the Canadian Medical Procurement and Assignment Board from Dr. J. C. Meakins, Dean of the Faculty of Medicine at McGill University:

"At a recent meeting of the Central Committee on Refresher Courses at McGill University it was decided that the first group of courses, as outlined in the announcement by the Hon. the Minister of the Department of Veterans' Affairs, which was compiled and presented by the C.M.P.A.B., would begin on January 14, and the second group on March 11. If a sufficient number of applications were received the refresher courses devoted entirely to Obstetrics and Gynæcology, code No. OI, would be offered between the dates of July 8 and August 17 inclusive. Further, it was decided that the charge for each of the courses would be $100.00."

The announcement referred to is the brochure "Facts About Your Medical Career on Demobilization" which has been distributed to civilian and serving medical officers.

University of Toronto

COURSES FOR EX-SERVICE MEDICAL OFFICERS

The Faculty of Medicine of the University of Toronto offers a two months' Refresher Course, beginning on January 14, 1946. Instruction will be given in the following subjects,: Medicine, Surgery, Obstetrics, Gynæcology, Pædiatrics.

This course will be given provided at least 25 applicants have registered before December 31, 1945.

The applications of the first 60 candidates only will be accepted in the order of date of application.

The fee for this two months' Refresher Course will be $100.00, payable on or before registration on January 14, 1946.

A similar Refresher Course will be conducted by the Faculty of Medicine beginning on April 1, 1946, provided at least 25 applications are received by March 16, 1946.

Miscellany

A New Anti-Corrosive

Rusting is a process as natural as death itself and has to be fought in peace and war alike. During the war, special research has been carried out in Britain to find anti-corrosive substances to protect every type of object liable to become rusty. One of the most interesting of these substances, invented and produced in the Manchester Oil Refinery, is called AC.10, which has been found to solve some of the most difficult problems connected with surgical instruments.

One such instrument is the cataract knife used in ophthalmic surgery. It is about one inch long and one-sixteenth of an inch wide, and must be very sharp as well as rigid.

It is very hard to produce the steel knife which has both these qualities: for the steel to be rigid, it must have a high carbon content, and the higher the carbon content, the more likely the steel is to corrode and, of course, corrosion immediately destroys sharpness.

In the past, it has been found that many optical knives have already become too badly corroded for use by the time they are first unpacked. But a far greater difficulty is met with in sterilization. Very exact methods of optical control have been devised which prove that even half-a-minute's immersion in boiling water produces incipient corrosion on the blade, and at least forty minutes' boiling is required for completely safe sterilization. Any cataract knife would be unfit for use long before it had been boiled for forty minutes.

If soda (2%) is dissolved in water, five minutes' boiling achieves sterility—but a cataract knife does not survive five minutes' boiling in soda; nor are chemical antiseptics much good as they are either corrosive or incompletely effective.

It was decided, therefore, to try out AC.10 on optical knives, for it was rightly felt that if the corrosion problem could be solved with them, AC.10 could be regarded as a perfect solution for all delicate instruments.

CONTINUAL TESTS

The knife-blades are coated with a thin film of AC.10 by dipping them into the fluid, and then they are boiled for five minutes or more in soda solution to which 2% of AC.10 has been added. Under these conditions no corrosion can be detected on the delicate knives however long they are boiled (in tests, boiling was prolonged continuously for many days), or however often boiling is repeated.

So the immediate problem was solved—and careful bacteriological experiments proved that the use of AC.10 in this way did not interfere at all with the effectiveness of sterilization.

Thus a by-product of the fight against rust has been the discovery of a powerful aid to asepsis. Sterilization of these delicate knives, hitherto always skimped or ineffective because of the danger of corrosion, now can be completely effective by the simplest and safest of all methods.

KEEPING INSTRUMENTS CLEAN

AC.10 is being used for the treatment of many kinds of surgical instruments, and the nurses in charge of operating theatres find that it is far easier to keep instruments bright and clean when they are treated with this substance. It can be used to protect scientific instruments of all kinds, particularly such delicate apparatus as gyroscopes, micrometers, verniers and small electric motors.

A whole family of anti-corrosive substances has now been created by the Manchester Oil Refinery, each member having its particular applications. Thus, AC.20 produces a rust-protecting film which will "creep" into the intricate working parts of a machine not easily reached; it can be employed for machinery in storage or for temporarily idle machine tools.

In the home, also, it will be useful; for bicycles, lawn mowers, perambulators and garden tools, most of which are carelessly exposed to rust by the average householder. A heavier "member of the family" is AC.40 which dries into a semi-stiff film and protects agricultural machinery and exterior surfaces and fittings, gutters, ventilators, etc. Finally, there is AC.50,

in which the rust inhibitor is incorporated in a petroleum jelly and can be spread in a thick layer over any object which has to be exported to a dangerous climate.—John Langdon-Davies, M.B.E., through the U.K. Information Office, Ottawa.

UNRRA Health Program in China

Dr. Leland A. Powers, former Health Director of the State of Washington, and now chief medical officer for UNRRA in Chungking, reports that activities of the health program in China have been stepped up. Eighteen doctors, sanitary experts and nurses joined the staff in Chungking, a special training program for Chinese experts was completed, a serious cholera epidemic brought under control, and action started on requests for speedy recruitment of approximately 200 additional medical persons for field operations.

Doctors recruited in this country who were sent by UNRRA in answer to urgent requests for help in the cholera epidemic are: James Watt, U.S. Quarantine Stations, New Orleans; Hobart A. Reimann, Jefferson College Medical Hospital, Philadelphia; William A. Frye, Vanderbilt University School of Medicine, Tennessee; Herbert K. Abrams, Chicago; Eldred K. Musson, Chicago Board of Health; Carlton B. Chapman, Boston City Hospital; and W. J. Wood, former assistant chief of Medical Services in the Canadian Army. Two sanitary engineers, Conrad P. Straub, Irvington, N.J., and Franz J. Maier, Jackson Heights, New York, accompanied the doctors.

The doctors were assigned to nine hospitals in the Chungking area that were turned over entirely to the treatment of cholera victims. The engineers were loaned to the Chungking Board of Health. According to the latest reports on the epidemic, the disease is now so well under control that the incidence of cholera is 50% less than it was last June.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. — ACTIVE FORCE

AUGUST, 1945

(*Previous sections in January, March, April, May, June, July, September and October, 1945.*)

SECTION LV

Name	Address	Date of Appointment
Allard, A.,	Baie St-Paul, Que.	3-7-45
Babineau, G.,	La Tuque, Que.	3-7-45
Beland, C.,	Cabano, Que.	3-7-45
Belanger, R.,	Kedgwick, N.B.	3-7-45
Beaudoin, L. P.,	Quebec	3-7-45
Beaule, A.,	Quebec	3-7-45
Carriere, O.,	St. Redempteur, Que.	3-7-45
Claveau, R.,	Chicoutimi, Que.	3-7-45
Ellison, L.,		15-6-45
Ferron, J.,	Louiseville, Que.	3-7-45
Foxgord, R. N.,	Victoria, B.C.	15-6-45
Gendron, J. B.,	Weyburn, Sask.	15-6-45
Gervais, L.,	St. Paul, Que.	3-7-45
Giard, T.,	St. Antoine, Que.	3-7-45
Gosselin, J.,	Desbiens Mills, Que.	3-7-45
Gregoire, G.,	Berthier, Que.	3-7-45
Janelle, L. P.,	Batiscan, Que.	3-7-45
Karefa-Smart, J. A. M.,	Montreal	9-7-45
Lambert, G. A.,	St. Romuald, Que.	3-7-45
Lambert, Y.,	Jonquiere, Que.	3-7-45
Larue, R.,	Quebec	3-7-45
Laurie, J. I. H.		5-2-45
Lavoie, R.,	Quebec	3-7-45
Lebel, G. A.,	Quebec	3-7-45
Mercier, R.,	Quebec	3-7-45
Morin, L.-P.,	Windsor Mills, Que.	3-7-45
McNicholl, A.,	La Malbaie, Que.	3-7-45
Nadeau, J.,	Robertsonville, Que.	3-7-45
Powers, A.,	Rockland, Ont.	3-7-45
Proulx, G. H.,	Montmorency, Que.	3-7-45
Quimper, A.,	Baie des Sables, Que.	3-7-45
Raymond, W.,	Quebec	3-7-45
Richard, V.,	Quebec	3-7-45
Simard, P.,	Hebertville, Que.	3-7-45
Tardif, G.,	Quebec	3-7-45
Tessier, P. E.,	La Perade, Que.	3-7-45
Vaillancourt, R.,	Noelville, Ont.	3-7-45
Villeneuve, J. M.,	Lac St. Jean, Que.	3-7-45

SEPTEMBER, 1945

SECTION LVI

Name	Address	Date of Appointment
Ascah, G. M.,	Farnham, Que.	16-8-45
Barg, P.,	Brooks, Alta.	16-8-45
Battista, A. F.,	Cornwall, Ont.	16-8-45
Beaupre, J. J. E.,	Montreal	1-9-45
Belisle, M.,	Montreal	1-9-45
Bigman, C.,	Quebec	4-7-45
Boright, R. R.,	Waterloo, Que.	16-8-45
Bourgoin, L.,	Outremont, Que.	1-9-45
Campbell, M.,	St. Hyacinthe, Que.	1-9-45
Caplan, H.,	Montreal	16-8-45
Caplan, H.,	Montreal	16-8-45
Champagne, J.,	Montreal	1-9-45
Charters, J. S.,	Westmount, Que.	16-8-45
Clairmont, G.,	St. Johns, Que.	1-9-45
Collip, B. V.,	Westmount, Que.	16-8-45
Colpitts, R. V.,	Salisbury, N.B.	16-8-45
Cownie, D. H.,	Montreal	16-8-45
Dagenais, M. A. J.,	Montreal	1-9-45
Delby, J. P.,	Halifax, N.S.	6-9-45
Desmarais, R.,	St. Thomas, Que.	1-9-45
Desrosiers, J. A. B.,	Lanorale, Que.	1-9-45
Dessureault, M.,	St. Adelphe, Que.	1-9-45
Doyle, C. E.,	Moncton, N.B.	6-9-45
Durand, L.,	Montreal	1-9-45
Edgecombe, P. W.,	St. John's, Nfld.	1-9-45
Gigot, A. F.,	Duparquet, Que.	16-8-45
Giroux, Y.,	St. Lambert, Que.	1-9-45
Gorman, T. W.,	Sydney, N.S.	16-8-45
Goulet, F.,	St. Honoré Shenley, Que.	3-7-45
Grignon, G.,	St. Jovite, Que.	1-9-45
Gross, J.,	Montreal	1-9-45
Guthrie, D. C.,	Montreal	16-8-45
Halfhide, R.,	Montreal	16-8-45
Hatcher, G. H.,	Montreal	16-8-45

Name	Address	Date of Appointment
Heninger, M. K.,	Raymond, Alta.	1-9-45
Hertz, R. E. L.,	Ormstown, Que.	16-8-45
Horner, E. B.,	Charteris, Que.	16-8-45
Hyde, R. W.,	Montreal	16-8-45
Hymovith, V. I.	Montreal	1-9-45
Kalichman, N.,	Outremont, Que.	16-8-45
Kincaide, C. M.,	Saint John, N.B.	1-9-45
Lalande, E.,	Ste. Genevieve, Que.	1-9-45
Lapierre, J. L.,	Outremont, Que.	1-9-45
Lefebvre, G. T. G.,	Huntingdon, Que.	16-8-45
Legresley, L. P.,	Montreal	1-9-45
Lesage, J. B.,	Verdun, Que.	1-9-45
Levitan, B. A.,	Ottawa	16-8-45
Long, L. A.,	Montreal	1-9-45
Lussier, J. J.,	Montreal	1-9-45
Marchildon, R. B.,	North Bay, Ont.	4-7-45
Margetts, E. L.,	Vancouver	16-8-45
McPherson, D. F.,	Killam, Alta.	1-9-45
Mercado, A. L.,	Montreal	1-9-45
Metiver, H. P.,	St. Norbert, Que.	1-9-45
Meunier, R. C.,	Montreal	1-9-45
Mireault, J. P.,	Ste. Marie Salome, Que.	1-9-45
Montour, J.,	Montreal	1-9-45
Mussells, F. L.,	Hampstead, Que.	16-8-45
Mustille, A. N.,	Montreal	16-8-45
Nadeau, J. P.,	Lewiston, Me., U.S.A.	1-9-45
Noël, M.,	Montreal	1-9-45
Ouimet, C. G. A.,	Ste. Scholastique, Que.	1-9-45
Parks, J.,	New Westminster, B.C.	16-8-45
Pearman, R. W.,	Montreal	1-9-45
Phelps, E.,	Ste. Agathe des Monts, Que.	1-9-45
Richard, M.,	Montreal	1-9-45
Rosen, H. J.,	Montreal	16-8-45
Rublee, J. E.,	Wilkie, Sask.	16-8-45
Ruddick, R. B.,	Montreal	16-8-45
St. Louis, H.,	Timmins, Ont.	1-9-45
St. Pierre, J. L.,	Montreal	1-9-45
Sansregret, D.,	Montreal	1-9-45
Shapiro, E.,	Quebec	3-7-45
Shaw, G. B.,	Bridgewater, N.S.	1-9-45
Silverman, S. B.,	Montreal	1-9-45
Standish, C. T.,	Vancouver	1-9-45
Stuart, F. K.,	Saint John, N.B.	1-9-45
Sturdy, D. D.,	Montreal	16-8-45
Surchin, H. H.,	Westmount, Que.	16-8-45
Tannenbaum, I.,	Montreal	16-8-45
Tyhurst, J. S.,	Victoria, B.C.	1-9-45
Villemaire, B.,	Ste. Julienne, Que.	1-9-45
Young, M. H. V.,	Ottawa	1-9-45
Wyatt, E. R. S.,	Montreal	16-8-45

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE AUGUST, 1945

SECTION LVII

Name	Address	Date struck off strength
Argue, H. H.,	Mount Forest, Ont.	17-7-45
Baker, C. E.,	Denzil, Sask.	6-6-45
Cowan, L. E.,	Kingston, Ont.	12-7-45
Demers, A.,	Cap de la Madeleine, Que.	20-6-45
Denney, M. L.,	London, Ont.	19-7-45
Gagnon, P. P.,	Rimouski, Que.	6-8-45
Geddes, A. K.,	Montreal	11-7-45
Gordon, S. D.,	Toronto	24-7-45
Handford, H. L.,	Renfrew, Ont.	17-7-45
Harvey, J. M.,	Olds, Alta.	28-7-45
Harvie, D. A.,	Collingwood, Ont.	19-7-45
Henry, W. A.,	Bentley, Alta.	8-7-45
Holmes, C. E.,	Lamont, Alta.	24-7-45
Jacobs, A. L.,	The Pas, Man.	2-8-45
Jauvoish, S.,	St. Vital, Man.	13-7-45
Martin, F.,	Chatham, N.B.	12-7-45
Mathews, W. H.,	Montreal	22-6-45
Minguy, C. E.,	Quebec	11-6-45
McCusker, E. A.,	Regina, Sask.	24-7-45
McCutcheon, W. M.,	Toronto	1-6-45
MacLaren, D. B.,	Toronto	27-7-45
Ogulnik, V. F.,	Westmount, Que.	23-7-45
Railton, S. V.,	Port Colborne, Ont.	14-7-45
Ranney, M. G.,	Callander, Ont.	20-7-45
Rice, W. C.,	Sydney, N.S.	17-7-45
Sarjeant, T. R.,	Toronto	14-7-45
Sparling, D. W.,	Montreal	22-6-45
Statten, T.,	Toronto	4-7-45
Stephenson, E.,	Winnipeg	25-7-45
Weissgerber, L. A.,	Gore Bay, Ont.	19-7-45
Wilson, W. A.,	Vancouver	13-7-45

SEPTEMBER, 1945

SECTION LVIII

Name	Address	Date struck off strength
Armitage, G. C.,	Schumacher, Ont.	9-8-45
Atkinson, W. L.,	Thornbury, Ont.	28-4-45
Clark, C. W.,	Winnipeg	28-8-45
Coleman, J. U.,	Duncan, B.C.	16-8-45
Damphousse, A.,	St. Paulin, Que.	8-9-45
Dillane, J. G. R.,	Hamilton, Ont.	1-8-45
Edwards, J. C. R.,	Newmarket, Ont.	1-9-45
Fraser, T. A.,	Toronto	23-8-45
Gossage, C. D.,	Toronto	21-7-45
Gottbieb, R.,	Outremont, Que.	24-7-45
Graham, A. F.,	Toronto	15-8-45
Hall, M. E.,	Toronto	29-8-45
Henderson, H. A.,	Toronto	30-7-45
Henneberg, C. C.,	Flin Flon, Man.	7-9-45
Hermann, J. D.,	Toronto	21-8-45
Hollenberg, C.,	Winnipeg	23-7-45
Hollis, K. E.,	Toronto	18-8-45
Hughes, R. A.,	Saint John, N.B.	15-9-45
Ireland, P. E.,	Toronto	20-8-45
Jacobson, M.,	Halifax	20-8-45
Janes, E. C.,	Hamilton	18-8-45
Jose, J. G.,	St. Mary's, Ont.	30-8-45
Kanovsky, S.,	Timmins, Ont.	25-8-45
Kergin, F. G.,	Toronto	22-8-45
Lansdown, L. P.,	Winnipeg	29-8-45
Lerner, A.,	Carstairs, Man.	7-8-45
Logan, H. L.,	Salisbury, N.S.	5-9-45
Lowrey, S. R.,	Toronto	8-8-45
MacDonald, C. A.,	Sydney, N.S.	11-7-45
MacEwen, H. B.,	Town of Mount Royal, Que.	9-8-45
McGarry, G. C.,	Niagara Falls, Ont.	13-7-45
MacLean, M. J.,	Toronto	27-7-45
Mace, W. E.,	London, Ont.	27-5-41
Malcolmson, P. H.,	Edmonton, Alta.	21-8-45
Megill, A. H.,	Ottawa	11-8-45
Melanson, J. A.,	Moncton, N.B.	18-8-45
Miller, B. C.,	Kingston, Ont.	6-8-45
Morgan, J. R. E.,	Toronto	12-8-45
Morris, D. B.,	Windsor, N.S.	29-5-45
Morris, G. D.,	Owen Sound, Ont.	11-8-45
Mundell, C. D. T.,	Montreal	15-8-45
Parney, F. S.,	Edmonton, Alta.	1-9-45
Paterson, J. C.,	Otawa	10-8-45
Pfeiffer, W. M.,	Port Daniel, Que.	1-8-45
Quehl, E.,	Edmonton, Alta.	6-9-45
Rabb, H. R.,	Fort Coulonge, Que.	21-8-45
Rae, C. A.,	Toronto	18-8-45
Ralph, R. E.,	Toronto	20-8-45
Ross, E. F.,	Halifax, N.S.	29-8-45
Roy, P.,	Quebec	30-7-45
Ryan, G. H.,	Winnipeg	19-7-45
Salsbury, C. R.,	Kingston, Ont.	13-8-45
Scheinert, J.,	Penetang, Ont.	14-8-45
Scott, C. V.,	Orillia, Ont.	18-8-45
Scott, J. R.,	Belleville, Ont.	16-7-45
Shaver, C. H.,	Sault Ste. Marie, Ont.	29-8-45
Skelley, A. J.,	Pembroke, Ont.	29-8-45
Smellie, T. H.,	Prescott, Ont.	22-8-45
Stratton, H. G.,	New Toronto, Ont.	26-7-45
Strohan, R. E.,	Saskatoon, Sask.	21-8-45
Tellson, A. G.,	Toronto	23-8-45
Tisdale, P. K.,	Winnipeg	4-9-45
Trueman, G. E.,	Vancouver	22-8-45
Tweddell, T. N.,	Kingston, Ont.	23-8-45
Wallace, S. A.,	Vancouver	15-8-45
Upton, M. D'A.,	London, Ont.	31-7-45
Vineberg, A. M.,	Montreal	24-7-45

Abstracts from Current Literature

Medicine

Papaverine in the Treatment of Coronary Artery Disease. Gray, W., Riseman, J. E. F. and Stearns, S.: *New England J. Med.*, **232:** 389, 1945.

A carefully controlled investigation of the effects of papaverine hydrochloride upon the symptoms of patients with coronary artery disease was carried out at the Angina Clinic of the Beth Israel Hospital, Boston. Intravenous administration of the drug was found to increase the work capacity and to decrease the usual electrocardiographic changes following exercise. Such changes, however, were too transitory to be of any real clinical value. In cases of coronary occlusion or coronary failure intravenous administration of 65 or 100 mgm. was of considerable value in the treatment of the associated pain.

NORMAN S. SKINNER

Low-Back Pain as the Presenting Symptom of Malignant Breast Tumours. Cohn, T. D. and Cohn, H.: *New England J. Med.*, **232:** 342, 1945.

It is not rare for primary malignant tumours of the breast to metastasize in the lower vertebral column and pelvis. Such an event may give rise to low-back pain before the primary growth is suspected or even before there is radiological evidence of bone change. Four cases of women treated for low-back pain for intervals of from one month to three years before the true cause was recognized form the basis of this report.

The work of Batson is reviewed to suggest the route of metastasis. This investigator has shown, through experimental work on monkeys and cadavers, that there is a vast intercommunicating system between the veins of the thorax and abdomen and the epidural and vertebral veins. This system of veins has no valves and the venous pressure is extremely low. Any increase in intrathoracic or intra-abdominal pressure results in a reversed flow in these veins, forming a ready means for the transportation of metastatic malignant cells.

The presence of low-back or pelvic pain, especially in women, should indicate a routine examination of the breasts.

NORMAN S. SKINNER

The Differentiation of Bronchogenic Carcinoma and Pulmonary Tuberculosis. Pillsbury, N. R. and Wassersug, J. D.: *New England J. Med.*, **232:** 276, 1945.

Bronchogenic carcinoma may closely simulate, and be mistaken for, pulmonary tuberculosis. Twelve such cases were found among patients admitted to sanatorium over a period of ten years. The usual trend of the disease was typically demonstrated in this small series of cases since all cases were of the male sex, the age varied between 40 and 68 and the right bronchial tree was most frequently involved (9 cases).

The physical signs and symptoms of bronchogenic carcinoma are notoriously inconsistent and are those which may occur with any intrapulmonary disease. Likewise any combination of roentgenologic findings (infiltration, atelectasis, cavitation) may be present. The progress of the disease is usually rapid and if surgery is to be effective early diagnosis is essential. Bronchoscopy is the most important diagnostic method and should be resorted to immediately the presence of bronchogenic carcinoma is suspected.

NORMAN S. SKINNER

The Comparative Value of Several Liver Function Tests. Teitelbaum, M. *et al.*: *Ann. Int. Med.*, **22:** 653, 1945.

The authors have found that in patients who are jaundiced, the best tests to use for the estimation of hepatic function are the serum protein determination and the glucose tolerance test. Generally such patients have had a van den Bergh test already performed. In patients who are not jaundiced, it appears that the best tests to use are the bromsulphalein dye excretion test, and the urobilinogen test. These patients too, usually have a van den Bergh test done. In either situation, the other tests may well add further information regarding the degree of impairment of hepatic function.

The value of any liver function test is directly proportional to an appreciation of the function or functions it is testing. No one test should be considered *the* test of liver function. The proper interpretation of a combination of these tests for specific functions will tell much about hepatic function and the degree of impairment. Repetition of certain of these tests from time to time in the course of the disease will further tell whether the disease in the liver is progressing, retrogressing or stationary.

S. R. TOWNSEND

Gastroscopic Studies in Naval Personnel with Chronic Seasickness. Benedict, E. B. and Schwab, R. S.: *New England J. Med.*, **233:** 237, 1945.

Roentgenological changes are found in about 50% of cases of chronic seasickness and form a characteristic triad of gastric hypersecretion, impaired gastric motility and pyloric spasm. In addition a few cases present an x-ray picture suggesting a moderate degree of hypertrophic gastritis.

Gastroscopic examination of 22 such cases revealed a normal stomach in 14, superficial gastritis in 5 (slight in 3, moderate in 2), moderate hypertrophic gastritis in one and gastric spasm in 2 cases.

The authors conclude that the gastroscopic picture is usually essentially normal in chronic seasickness.

NORMAN S. SKINNER

Penicillin in the Treatment of Pneumococcal, Meningococcal, Streptococcal and Staphylococcal Meningitis. White, W. L., Murphy, F. D., Lockwood, J. S. and Flippin, H. F.: *Am. J. M. Sc.*, **210:** 1, 1945.

The authors' conclusions are based on a study of 71 cases of acute coccal meningitis treated with penicillin. Of the five streptococcal cases only one recovered, though three were almost moribund before therapy. All four patients with staphylococcus aureus meningitis recovered from the acute infection though one died later. Six of twelve meningococcal cases died. Penicillin and sulfonamides were combined in two cases. In the pneumococcal, meningococcal and streptococcal cases penicillin was often effective after sulfonamide therapy had failed to produce the desired response.

As a result of their experience the following plan of therapy was evolved: (1) Two hundred thousand units of penicillin by the continuous intravenous route daily during the acute phase. (2) Ten to twenty thousand units intracisternally once or twice each day. (3) Ample sulfadiazine or sulfamerazine therapy systemically to attain blood levels of over 15 mgm. % of full drug in conjunction with the administration of penicillin. (4) Continuation of intracisternal penicillin until four days after the spinal fluid has cleared and nuchal rigidity has begun to decrease, and systemic penicillin therapy until 7 to 10 days after the disappearance of all signs of infection.

E. S. MILLS

A Study of the Types of Hypersensitivity Induced by Penicillin. Rostenberg, A. Jr. and Welch, H.: *Am. J. M. Sc.*, **210:** 158, 1945.

The authors tested 144 individuals with crystalline penicillin sodium for sensitivity to the drug. The test was made by an intradermal injection of 0.1 c.c. of penicillin sodium containing 1,000 units. In all cases where a positive reaction resulted, a retest was made with crystalline penicillin. Five of the 144 tested exhibited a positive reaction of the tuberculin type

despite the fact that none of these individuals had had any prior contact with penicillin. Repeated multiple intradermal injections of penicillin sodium in some cases caused the development in some of reactions of the Arthus type. Some of these also developed a tuberculin type of hypersensitivity. Only two hypersensitive patients had received therapeutic doses of penicillin. Neither of these showed any immediate systemic reaction although one later developed a diffuse miliary papulovesicular dysidrosiform eruption persisting for several days. E. S. MILLS

Tularæmic Pneumonia, Review of American Literature and Report of 15 Additional Cases. Stuart, B. M. and Pullen, R. L.: *Am. J. M. Sc.*, **210:** 223, 1945.

The authors report 15 additional cases of tularæmia from the Charity Hospital of Louisiana. They have reviewed all cases of tularæmia observed at the hospital (225) and have found 21 cases of pneumonia, an incidence of 9.33%. Pneumonia occurred in 13 of 181 cases of the ulceroglandular type of infection and in 8 of 14 instances of typhoidal tularæmia. The symptoms fall into two groups depending on the type of infection. In the ulceroglandular group the pneumonia may occur from 2 days to many months after the localized infection has developed. In the typhoidal and cryptogenic type the infection frequently appears to originate as a primary pneumonia suggesting that the infection may have entered through the respiratory tract. The onset may be sudden with a chill, fever, dyspnœa, cough and pain in the chest. Only half the patients have any sputum. The fever curve is irregular and spiking with a relatively slow pulse. The pneumonia is of the lobular or confluent lobular type. The cellular reaction in the lung is of the mononuclear variety. Confirmations of the diagnosis may be obtained through blood cultures, sputum culture or lung puncture. Treatment is purely supportive. Sulfonamides and penicillin have proved ineffective. The mortality is high—in the vicinity of 60%. E. S. MILLS

Surgery

Early Rising Following Major Surgical Operations. Lever précoce à la suite d'opérations majeures. Schafer, P. W. et Dragstedt, L. R.: *Surg., Gyn. & Obst.*, **81:** 93, 1945.

Les vertus du lever précoce ne sont guère plus critiquées que par ceux qui l'ont peu pratiqué ou qui se sont attirés malencontreusement des complications éventuelles que ne justifient tout de même pas l'abandon d'une pratique qui tend de plus en plus à se généraliser tant en Europe qu'en Amérique. Evidemment le lever précoce n'est devenu possible et recommandable que par suite des progès de l'aseptie, de l'anesthésie, des thérapeutiques pré et post-opératoires, de la sécurité avec laquelle sont manipulés les tissus, de l'administration de transfusions.

Toutefois, les auteurs remarquent qu'ils ont introduit avec une certaine appréhension le lever précoce dans les cas d'opérations majeures. Ils n'ont eu qu'à se féliciter des résultats obtenus qu'ils exposent dans un tableau relatif à 103 cas, complété par des graphiques de température.

Le premier et le plus important résultat du lever précoce est la prévention d'affection pulmonaires mineures et majeures. Le second consiste dans la diminution et un abaissement plus marqué de la température de l'opéré comparé avec les cas de lever tardif. Enfin l'absence d'asthénie et l'amélioration de l'état général sont aussi d'autres avantages dont bénéficient les malades que l'on fait lever précocement. Ajoutons, du point de vue matériel, que les frais d'hospitalisation sont moins élevés, que l'hôpital peut recevoir un plus grand nombre de cas successifs et que les infirmières sont immobilisées moins longtemps auprès d'un patient qui peut s'aider lui-même qu'auprès d'alités qui dépendent entièrement d'elles pour le moindre mouvement.

Reste la possibilité d'une légère déhiscence, d'un retard de cicatrisation ou d'une éventration post-opératoire. Les auteurs estiment que ces complications ne sont pas plus fréquentes dans les cas de lever précoce que dans ceux de lever tardif et ne suffisent pas à condamner le premier. PIERRE SMITH

Primary Resection (Closed Anastomosis) of Rectal Ampulla for Malignancy with Preservation of Sphincteric Function. Résection initiale (Anastomose complète) de l'ampoule rectale pour tumeur maligne avec conservation de la fonction sphinctérienne. Wangensteen, O. H.: *Surg., Gyn. & Obst.*, **81:** 1, 1945.

L'auteur veut démontrer que la conservation de la fonction sphinctérienne est réalisable et souhaitable dans les cas adéquats lors d'une intervention radicale pour une tumeur maligne de l'ampoule rectale. Il souligne, en passant, les causes de mauvaise cicatrisation dans les résections des lésions de l'ampoule rectale.

La description de sa technique opératoire est accompagnée d'illustrations extrêmement explicites des temps successifs de l'opération. L'incision verticale sous-ombilicale ou para-médiane droite est employée. L'anesthésie est au cyclopropane complétée de petites quantités de curare par voie intraveineuse. L'opération est associée à une résection subséquente du colon et du rectosigmoïde et à l'excision secondaire des métastases des lobes hépatiques. Beaucoup de patients se montrant réfractaires à la colostomie, il semble que l'opération conservatrice suggérée par l'auteur soit généralement bien accueillie. Cependant, à moins de petites lésions situées bas ou de lésions de l'extrémité supérieure du rectum, pour lesquelles elle est indiquée, cette opération, n'enlevant pas les muscles releveurs ni les zones latérales d'envahissement lymphatique, ouvre, par conséquent, la porte à une récidive.

Dans la plupart des cas, la fonction sphinctérienne a été bonne après la résection de l'ampoule. Toutefois, dans certains cas, une colostomie complémentaire a été nécessaire pour enrayer promptement une infection locale de l'espace pelvirectal postérieur.

L'auteur a pratiqué l'opération dans 3 cas de colite ulcéreuse, les 24 autres étant des cancers du rectum. Un tableau décrivant les résultats obtenus sur ces 27 patients ayant subi la résection de l'ampoule rectale complète cette longue et minutieuse étude.

PIERRE SMITH

Experiments on Head Wounding by High Velocity Missiles. Butler, E. G., Puckett, W. O., Harvey, E. N. and McMillan, J. H.: *J. Neurosurg.*, **2:** 358, 1945.

In living structures, such as the head, limb and various excised organs of cats and dogs shot with steel spheres, microsecond roentgenograms indicate the formation of large temporary cavity. This cavity exists for a matter of microseconds after passage of a high velocity missile. Much of the damage to the brain and skull results from the pressure developed within the skull by the large temporary cavity. A relatively small missile shot at high velocity through a cat's head caused extensive disarticulation of bone along suture lines, compound fractures of individual bones and extensive maceration of the brain. That these injuries were the result of high internal pressure was demonstrated by shooting a cat's head from which the brain had been removed by way of the foramen magnum. Under such circumstances a high velocity missile caused only minor damage to the skull. FRANK TURNBULL

Subdural Hygroma. Wycis, H.: *J. Neurosurg.*, **2:** 340, 1945.

The persistence of headache, vertigo, irritability, memory impairment and mental confusion after the acute stage of a cerebral trauma has passed should suggest the possibility of subdural hygroma. In the acute cases the differentiation from a subdural hæmatoma can usually only be settled by trephining the skull. Exces-

sive accumulations of subdural fluid usually result from trauma. The fluid in these cases is generally considered to be the result of tearing of the arachnoid, the rent acting as a ball-valve mechanism preventing the return of cerebrospinal fluid to its original confines. Occasionally, subdural effusions may arise secondary to infection of overlying bone, as in mastoiditis. Rarely, the accumulations of fluid are secondary to a communicating hydrocephalus with tearing of the arachnoid at the basal cistern. Spinal puncture is not diagnostic. The pressure may be subnormal, normal or increased. The fluid may be clear, xanthochromic or blood-tinged. A fracture of the skull may or may not be present. Pneumoencephalography may demonstrate a characteristic absence of subarachnoid filling over one or both hemispheres. Operative treatment is bilateral trephining of the skull with drainage of the subdural space for 24 to 48 hours. FRANK TURNBULL

Some Recent Accomplishments of Thoracic Surgery. Adams, W. E.: *Arch. Surg.*, **50:** 277, 1945.

This is the Dr. Carl A. Hedblom lecture presented at the University of Illinois College of Medicine. The author reviews some facts of historical interest connected with the development of thoracic surgery, commencing with Stephen Paget's work published in 1896. Paget stated that: "It is sometimes said that surgeons fifty years hence will think as little of our results as we think of the methods of fifty years ago. So far as regards the surgery of the chest this is utterly untrue. Fifty years ago it had risen above the horizon. It is now nearly at its zenith." Factors involved which have delayed the development of thoracic surgery are: (1) Altered cardio-respiratory function due to disturbance of intrathoracic pressures. (2) Methods of diagnosis and (3) resection of pulmonary tissue.

One of the major factors which retarded intrathoracic surgery was the fear of an open pneumothorax. Adams discusses physiological considerations and methods of diagnosis. The lack of diagnostic methods was one of the chief factors in the delay. With the advent of the roentgen rays and later of the bronchoscope, the possibility of diagnosis was much enhanced. Lobectomy for tumour and for bronchiectasis was accomplished as early as 1907 by Gluck, and his results were improved by Sauerbruch. One of the most outstanding achievements of thoracic surgery has been the development of the surgical treatment of pulmonary tuberculosis.

The author reviews the early methods of treating acute empyemas by open drainage, the treatment of pulmonary abscess and of bronchiectasis.

Primary carcinoma of the lung, which in Paget's time was thought to be a rare disease, is now known to comprise approximately 8% of all malignant tumours. Attempts to cure this tumour by irradiation have been made for years but without success. In 1933, Graham successfully performed a total pneumonectomy and a partial thoracoplasty for bronchogenic carcinoma of the lung. Successful surgical treatment depends largely on early diagnosis. Adams discusses the clinical symptoms, anæsthesia, the operative methods for pneumonectomy and the results of surgical treatment during the past decade.

G. E. LEARMONTH

Obstetrics and Gynæcology

The Relation of Vitamin B_1 Deficiency to the Pregnancy Toxæmias. King, G.: *J. Obst. & Gyn. Brit. Emp.*, **52:** 130, 1945.

There was a striking increase in the incidence of beri-beri in Hong-Kong during the years 1939, 1940, 1941. This was a true increase and was seen in general medical and surgical cases as well as in obstetrical cases. There was an almost parallel increase in the incidence of pregnancy toxæmia during the same period, especially in cases of eclampsia and of severe pre-eclampsia. This also was a true increase, the toxæmia rate rising from 3.45% during the preceding 3 years to 7.82% during the 3 years under review. Some correlation between these figures is inescapable, and it was found that, out of 371 cases of beri-beri complicating pregnancy during this period, no fewer than 252 cases were further complicated by pregnancy toxæmia. The diagnosis of beri-beri and pregnancy toxæmia was supported by both clinical and laboratory findings. Significantly high readings of the pyruvic acid content of the blood were obtained in the majority of cases. In cases suffering from toxæmia with complicating manifestations of beri-beri, the prognosis was considerably more grave than in cases of toxæmia without frank signs of beri-beri. This was particularly seen in the eclampsia cases, in which a mortality rate of 38.8% was found in 36 cases complicated by beri-beri, as opposed to 11.6% in 43 uncomplicated cases. It is suggested that the primary factor responsible for the heavy increase in pregnancy toxæmia during the years under review was vitamin B_1 deficiency.

P. J. KEARNS

Studies in X-Ray Pelvimetry. Heyne, O. S.: *J. Obst. & Gyn. Brit. Emp.*, **52:** 148, 1945.

A new method of obtaining the distance between the ischial spines is shown. The error is less than 1%, which amounts to less than .1 mm. With the pelvic brim horizontal, the ischial spines are in all cases very close to 3.0 cm. from the table surface, and this makes the calculation possible. The pubosacral diameter cannot be measured precisely on a lateral view film, because the anterior point is indeterminate, even by Nicholson's stereometric method of exposing a film for this diameter only. Clinical measurement is at least as accurate, and figures are given to show that subtraction for the sacral thickness is necessary in this case. The level of the spine of the last lumbar vertebra, relative to the pelvic brim and promontory, is discussed fully. With the brim horizontal, the last lumbar spine is at the level of the conjugate with a semirecumbent position convenient for x-ray work. An antero-posterior view in the above position provides the areas of inlet and outlet, and an inlet index. No more than this is required for practical purposes except to palpate the pubic arch for height, width, and the height of the symphysis pubis. If the arch is suspiciously narrow, a radiograph giving accurate measurements can be obtained simply. It is considered that a lateral view of the pelvis is very rarely of value. Unsatisfactory results with the transverse diameter of the brim led to experiments which show that by no x-ray method can the actual transverse of the brim be shown. The iliac portion of the iliopectineal line cannot be seen on any film. It is, therefore, impossible by radiographic means to obtain measurements of the superior strait, *i.e.*, excluding the conjugata vera on the lateral film. P. J. KEARNS

Extragenital Chorionepithelioma, Report of a Case with Chorionepithelioma of the Breast Occurring During the Course of Pregnancy. Resnick, L.: *J. Obst. & Gyn. Brit. Emp.*, **52:** 180, 1945.

The occurrence of chorionepitheliomatous growths in extragenital organs without microscopical evidence of a primary focus in the genital tract, has led to the formulation of several theories regarding the origin of the tumours. (1) Transportation of chorionepitheliomatous emboli from a previous chorionepitheliomatous placenta completely expelled during labour. Schmorl examined the lungs of 158 patients dying at different stages of pregnancy or after delivery and found chorionic cells in the lung capillaries in 80% of the normal pregnancies. In the lungs of women dying of eclampsia, chorionic cells obstructed the capillaries, sometimes extensively, in every case examined. In 8 out of 22 cases dying of abortion, during the first 2 months, there were chorionic cells in the lung capillaries. In only 3 cases was there evidence in the

lung capillaries of chorionic cell proliferation, and in view of the lack of examination of the placenta, hydatidiform or chorionepitheliomatous changes could not be excluded. In accordance with these findings Schmorl laid emphasis on the possibility that "ectopic" chorionepithelioma might originate from a previous mole, or chorionepitheliomatous proliferation of a placenta completely expelled during labour. He quoted a case in which 18 weeks after a normal pregnancy, a tumour was detected in the vagina. Death occurred within 6 months. The uterus and appendages were not involved by any growth, but metastases were found in the lungs, liver, kidney, and intestines. The vaginal neoplasm and the metastases gave the typical picture of a "syncytial" growth. Marchand and Pick maintained that chorionic cells or villi deposited during normal pregnancy may likewise give rise to chorionepithelioma, and that most cases of "ectopic" chorionepithelioma revealed a history of normal pregnancy, hydatidiform mole being relatively rare.

P. J. KEARNS

A Case of Coexisting Tuberculosis and Cancer of the Uterus. Smith, G. H.: *J. Obst. & Gyn. Brit. Emp.*, **52:** 189, 1945.

The study of the tumour leads to the conclusion that it was an anaplastic adenocarcinoma of the body of the uterus. The tubercles were largely non-caseous and evidently fairly young. Their distribution and development would suggest that they are younger than the tumour and probably disseminated from the obviously older tubal lesion. It is interesting to find tubercle follicles in the tumour mass itself and in continuity with the neoplastic process. There is nothing to suggest that the tuberculous process has any bearing on the origin of the tumour. The cervix was not removed and unfortunately could not be examined. It appears, therefore, that the tuberculous involvement was secondary and probably by lymphatic or hæmatogenous spread from a distant focus, presumably the older tubal lesion. The association seems to be accidental, except that the uterine tumour may have acted as a favourable nidus for the development of the tuberculous lesion spreading from the Fallopian tubes.

P. J. KEARNS

Exercises in Dysmenorrhœa. Haman, J. O.: *Am. J. Obst. & Gyn.*, **49:** 755, 1945.

In a group of 129 dysmenorrhœics, of whom 84 suffered from primary dysmenorrhœa and 45 from secondary dysmenorrhœa, treatment by special exercises was followed by definite relief in 84.5%. In many instances the beneficial effect lasted for at least twenty months, which was the limit of the follow-up period in this investigation. Within the sub-group of those afflicted with primary dysmenorrhœa the percentage of alleviation was 89.3.

ROSS MITCHELL

Test Case to Show Value of Cervical Cytology Smear in Uterine Cancer Diagnosis. Ayre, J. E., Bauld, W. A. G. and Kearns, P. J.: *Am. J. Obst. & Gyn.*, **50:** 102, 1945.

A case is presented in which an early cervical cancer was detected by the cervical cytology smears while the lesion was so localized as not to be detectable by the trained eye or the finger and 50% of the surgical biopsies failed to show it.

It would appear that the vaginal and cervical cytology smears are of definite value in the diagnosis of very early as well as advanced cases of uterine malignancies.

ROSS MITCHELL

The Circulation of Amniotic Fluid. Mengert, W. F. and Bourland, J. W.: *Am. J. Obst. & Gyn.*, **50:** 79, 1945.

Present concepts of the origin and circulation of amniotic fluid are discussed. The anatomical findings in two infants with duodenal atresia, whose mothers developed hydramnios during the second semester, are presented to support the theory that there is a constant absorption as well as production of amniotic fluid during normal pregnancy.

Failure to absorb usual quantities of amniotic fluid did not influence the gestational development of these two infants.

The association of hydramnios with subsequent birth of a normal-appearing infant who speedily develops persistent and forceful vomiting appears to be a syndrome characteristic of atresia of the upper portion of the duodenum.

ROSS MITCHELL

Continuous Caudal Analgesia in Obstetrics on Trial. Nicodemus, R. E., Ritmiller, L. F. and Ledden, L. J.: *Am. J. Obst. & Gyn.*, **50:** 312, 1945.

Where caudal analgesia is used the labours are longer. Uterine contractions are of less intensity, the expulsive force of the abdominal musculature is lost. Occiput posterior positions rotate less often and operative deliveries are increased. On the other side of the scales we can place the advantages of this technique, such as easier and safer breech deliveries, a lower incidence of stillbirths, a lower maternal morbidity, diminished blood loss with delivery, less permanent damage to the birth canal, and a pleasant, happy, cooperative patient. We have not yet found the utopian type of obstetric analgesia, but continual caudal analgesia is a distinct advance in this field and an excellent method to add to the armamentarium of every obstetrician.

ROSS MITCHELL

Oto-Rhino-Laryngology

Modern Trends in Sinus Therapy. Van Alyea, O. E.: *Eye, Ear, Nose & Throat Monthly*, **24:** 125, 1945.

Sinus therapy is based on our knowledge of nasal physiology and the histopathology of sinus mucous membrane. The cilia which wave in the direction of the sinus outlets and the sheet of mucus which covers them serve as a primary defense mechanism. A second defense is found in the stroma of the mucous membranes. Contributing factors to sinus infection are: the impinging middle turbinate; a cellular turbinate; the presence of cells encroaching on the ostia. These factors may impair the drainage of the frontal or anterior ethmoid sinuses. Hyperplastic or polypoid tissue associated with chronic infection or allergy is the principal cause of drainage blockage.

Few drugs may be applied to the nasal ciliated membrane without causing harm. The nose-drops should be: (1) non-detrimental to ciliary action; (2) slightly acid with a pH of 5.5 to 6.5; (3) isotonic; (4) non-injurious to the mucous membrane; (5) devoid of systemic side effects.

Solutions of ephedrine ¼ to 1% in saline or ephedrine-like solutions fulfill these requirements. The solutions containing oil or silver protein or silver salts (argyrol and neosilvol) are not acceptable.

The most common cause of nasal blockage are nasal allergy, systemic disorders producing vasodilatation in the turbinates, the swelling of the nasal tissues to suppurating sinuses.

The author summarizes the indications for submucous resection: (1) Deviated septum with nasal blockage, when all other possible causes have been eliminated. (2) Pressure from a deformed septum crowding the middle turbinate against the lateral wall thereby blocking sinus drainage. (3) Pronounced spurs or ridges which impinge on the inferior turbinate.

The membrane lining a sinus is a disease-resisting membrane. The sinus cavity is infected because of inadequate drainage facilities; the infection and the thickening of the mucosa persist for the same reason. With the prompt removal of the exudate, hyperplastic changes will not occur and if present, will disappear.

The modern trend toward conservative treatment is attributable not only to the failure of the radical

operation as the fronto-ethmosphenoidectomy but also to the improvement in the conservative measures as infraction of the middle meatus, correction of a deviated septum, removal of polyps, proper management of an allergic rhinitis, a few sinus irrigations, window operation in the inferior meatus, displacement therapy for the ethmoid cells. The multi-operated cases commonly respond well to the proper non-surgical procedures as removal of secretions and physical therapy.

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Most of the lower abdominal approaches in which a double dose of morphine had been used, required the the addition of ether to the ethylene-oxygen mixture. The cases using a vaginal approach responded much better to the double dosage and were able to be performed with ethylene oxygen alone. However even these had more complications than those having only the single dose of morphine preoperatively.

Much respiratory depression was encountered with the double dose patients when it was required to supplement the ethylene with ether. Surprisingly enough, there was as much or more apprehension at induction following the double doses of morphine as there was after the single dose.

Anæsthetic complications such as laryngospasm and excessive depression either at induction or throughout the operation occurred much more frequently following the double dosage. Postoperative complications were twice as numerous with the single as with the double doses but this may be partly accounted for by the fact that they were employed in the poorer risk group.

The routine use of double doses of morphine followed by potent anæsthetic agents must be considered a very questionable practice.

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Pentothal sodium alone does not uniformly provide adequate muscular relaxation unless used in excessive

quantity but when its intravenous use is combined with regional nerve block excellent relaxation resulted. Novocain was employed regionally.

In abdominal operations anterior splanchnic block presents technical difficulties and the author's technique, employing the use of a special splanchnic needle guide, is described in detail. NORMAN S. SKINNER

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FRANK G. PEDLEY

Pseudodoxia Pædiatrica. Bakwin, H.: *New England J. Med.*, **232:** 691, 1945.

The author, who is Associate Professor of Pædiatrics at New York University College of Medicine, points out that in the past medicine has been guilty of advocating practices which have subsequently been shown to be actually harmful. The routine cleansing of infants' mouths, the use of mineral oil drops in infants' noses, the vigorous cleansing of vernix caseosa from the skin, the almost routine removal of tonsils are illustrations of accepted practices a few years ago which have now been or should be abandoned. In regard to tonsillectomy he quotes a survey of 1,000 New York school children by the American Child Health Association. Of the children surveyed 61% had already had their tonsils removed. The remaining children were re-examined and 45% of them were recommended for tonsillectomy. Those not recommended for tonsillectomy were examined again by a different group of physicians and 46% of these were recommended for tonsillectomy. The survivors of the 2 re-examinations were examined a third time and 46% of them were recommended for tonsillectomy. Thus had all the original 1,000 children followed medical advice only 65 would have been left in possession of their tonsils. The American Child Health Association concluded from this study that tonsillectomy as currently practised represented in the main a useless expenditure of time, effort and money.

The frequency of myringotomy (diminished now since the introduction of sulfa drugs) was, in the opinion of the author often a cause rather than a cure of purulent otitis media. Other illustrations could be given of former practices considered at the time good but later considered pernicious. And the point is raised as to whether there are not now practices which in due time will be discarded as pernicious.

The author thinks that the trend toward hospitalization of all confinements should be seriously questioned. He quotes the experience of the Frontier Nursing Service of Kentucky where most confinements are done in poor homes by midwives. The following table summarizes this experience:

STATISTICAL ANALYSIS OF THE FIRST 4,000 DELIVERIES BY THE FRONTIER NURSING SERVICE

Percentage of babies delivered in the home	92.70
Percentage of babies delivered in hospital	7.30
Puerperal deaths per 1,000 live births	0.76
Cæsarean section per 1,000 births	0.18
Forceps delivery per 1,000 births	0.83
Neonatal deaths per 1,000 live births	30.30
Stillbirths per 1,000 live births	30.20

Bakwin believes that the dangers inherent in hospitalization for pregnant women, new born babies and children have not been fully appreciated. Not only do physical dangers, such as epidemic diarrhœa and respiratory infections, exist, but important psychological dangers to both mother and child may also be present.

Many other current medical practices are open to criticism. Nutrition, not only on the side of excessive vitamin therapy, but also probably on the emphasis on the academic point of view to the neglect of really good cooking and agreeable conditions for eating, has no doubt gone sadly astray. "It is unusual nowadays to see a new patient who is not receiving vitamin supplements, yet there is no definite clinical evidence that deficiency diseases are at all widespread among children or that any benefit can be derived from the general use of vitamins, except in the case of vitamins C and D in infancy." As between chef and dietitian he would choose the chef without reservation.

FRANK G. PEDLEY

Industrial Medicine

Non-Occupational Absenteeism—A Statistical Analysis. Schapiro, M. M.: *Indust. Med.*, **14:** 390, 1945.

Various studies conducted on absenteeism, lost time and disability among industrial employees have established the fact that about 90% of the time lost in industry is due to non-occupational illnesses. The resultant effect is seen in the great financial and pro-

operation as the fronto-ethmosphenoidectomy but also to the improvement in the conservative measures as infraction of the middle meatus, correction of a deviated septum, removal of polyps, proper management of an allergic rhinitis, a few sinus irrigations, window operation in the inferior meatus, displacement therapy for the ethmoid cells. The multi-operated cases commonly respond well to the proper non-surgical procedures as removal of secretions and physical therapy.

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FRANK G. PEDLEY

Pseudodoxia Pædiatrica. Bakwin, H.: *New England J. Med.*, **232:** 691, 1945.

The author, who is Associate Professor of Pædiatrics at New York University College of Medicine, points out that in the past medicine has been guilty of advocating practices which have subsequently been shown to be actually harmful. The routine cleansing of infants' mouths, the use of mineral oil drops in infants' noses, the vigorous cleansing of vernix caseosa from the skin, the almost routine removal of tonsils are illustrations of accepted practices a few years ago which have now been or should be abandoned. In regard to tonsillectomy he quotes a survey of 1,000 New York school children by the American Child Health Association. Of the children surveyed 61% had already had their tonsils removed. The remaining children were re-examined and 45% of them were recommended for tonsillectomy. Those not recommended for tonsillectomy were examined again by a different group of physicians and 46% of these were recommended for tonsillectomy. The survivors of the 2 re-examinations were examined a third time and 46% of them were recommended for tonsillectomy. Thus had all the original 1,000 children followed medical advice only 65 would have been left in possession of their tonsils. The American Child Health Association concluded from this study that tonsillectomy as currently practised represented in the main a useless expenditure of time, effort and money.

The frequency of myringotomy (diminished now since the introduction of sulfa drugs) was, in the opinion of the author often a cause rather than a cure of purulent otitis media. Other illustrations could be given of former practices considered at the time good but later considered pernicious. And the point is raised as to whether there are not now practices which in due time will be discarded as pernicious.

The author thinks that the trend toward hospitalization of all confinements should be seriously questioned. He quotes the experience of the Frontier Nursing Service of Kentucky where most confinements are done in poor homes by midwives. The following table summarizes this experience:

STATISTICAL ANALYSIS OF THE FIRST 4,000 DELIVERIES BY THE FRONTIER NURSING SERVICE

Percentage of babies delivered in the home	92.70
Percentage of babies delivered in hospital	7.30
Puerperal deaths per 1,000 live births	0.76
Cæsarean section per 1,000 births	0.18
Forceps delivery per 1,000 births	0.83
Neonatal deaths per 1,000 live births	30.30
Stillbirths per 1,000 live births	30.20

Bakwin believes that the dangers inherent in hospitalization for pregnant women, new born babies and children have not been fully appreciated. Not only do physical dangers, such as epidemic diarrhœa and respiratory infections, exist, but important psychological dangers to both mother and child may also be present.

Many other current medical practices are open to criticism. Nutrition, not only on the side of excessive vitamin therapy, but also probably on the emphasis on the academic point of view to the neglect of really good cooking and agreeable conditions for eating, has no doubt gone sadly astray. "It is unusual nowadays to see a new patient who is not receiving vitamin supplements, yet there is no definite clinical evidence that deficiency diseases are at all widespread among children or that any benefit can be derived from the general use of vitamins, except in the case of vitamins C and D in infancy." As between chef and dietitian he would choose the chef without reservation.

FRANK G. PEDLEY

Industrial Medicine

Non-Occupational Absenteeism—A Statistical Analysis. Schapiro, M. M.: *Indust. Med.*, **14:** 390, 1945.

Various studies conducted on absenteeism, lost time and disability among industrial employees have established the fact that about 90% of the time lost in industry is due to non-occupational illnesses. The resultant effect is seen in the great financial and pro-

ductive losses to both employers and employees. That the short term illness is a leading factor in this loss has not been generally recognized. In this article are presented the statistical findings of a study of 2,420 cases of lost time over a two-year period in a large industrial establishment. Tables show (1) Incidence of time lost for all employees according to age distribution. (2) Incidence of time lost by all employees according to departments. (3) Incidence of time lost according to illness for all employees. (4) Incidence of non-occupational illness by departments.

It was found that the duration of absenteeism per employee per year per illness, in 37.5% of the cases, was 3 to 8 days, and in 35.6% of the cases, 8 to 31 days. Only 18.4% of the cases lost less than 72 hours per illness per year and 8.5% lost over 31 days per year. Of the employees who had absentee records, 56.8% were between 26 and 45 years of age, the period of greatest activity and productivity.

It was also observed that most of the cases of lost time were found in seven major departments, namely, mines, mills, open hearth, yard, transportation, maintenance and blast furnaces.

The leading causes of the lost time during this two-year period of the study were also determined. Disease of the upper respiratory tract accounted for 38.9% of recorded absences; digestive complaints of all types for 10.7%; rheumatism and other related locomotor articular dysfunctions, for 7.5%, and non-occupational injuries and accidents for 7.1%. It was noted that with the exception of the upper respiratory infections there was a marked predominance of disabilities in the negro employees.

No definite relationship was evidenced between occupational exposure, environment, etc., and the onset of a non-occupational illness, and similarly none was demonstrated between occupational exposure and the duration of absenteeism. MARGARET H. WILTON

Vision in Industry. *The Lancet*, **1**: 518, 1945.

This article reviews a discussion of ophthalmological problems and visual standards in industry, which took place at a recent meeting of the Association of Industrial Medical officers, held in the London School of Hygiene. The importance of adequate legislation in r gard to lighting was stressed. The hope was expressed that in the future the direction of workers into jobs for which they are physically best fitted will be combined with the training of the physically handicapped. A chart was shown to illustrate the way in which workers can be graded into five visual groups and an explanation given as to the type of work suitable for each visual group. One-eyed workers can be employed in most jobs, but the safety of the good eye should always be ensured. In modern industry even the totally blind can be employed. Suggestions regarding treatment were also given. In the opinion of one of the speakers, the best first-aid treatment for glaucoma is to do nothing except refer the patient immediately to an ophthalmic surgeon.

In connection with lighting and colour schemes in factories the view was held that these are questions for the physiologist and physicist.

MARGARET H. WILTON

The concept of research as an individualistic expression of thought is not in conflict with mass production through research. Such composite research endeavour is necessary for industry and it may be obligatory for life, as has been recently demonstrated in such a superb fashion for penicillin. Even in this instance, the great discovery which made necessary group activity came from one individual who made an observation and, of most importance, had a thought.—W. de B. MacNider in *The Diplomate*, September, 1945.

Obituaries

Dr. John A. Belch died recently in Syracuse, N.Y. He was 82 years old. He was born at Tamworth and received his early education in Napanee public schools. He entered Queen's at an early age and some time after graduation he set up practice in the city of Syracuse, N.Y., where he had resided for over 50 years.

He was widely known in that city as an obstetrician and general practitioner. At the time of his death he was a member of the staff at the Onondaga General Hospital and was also on the staff of the Crouse-Irving Hospital. He was prominent in fraternal circles and at the time of his death was a 32nd Degree Mason.

Surviving are one brother, Fred J. A. Belch, Kingston; two nephews, and a niece, of Kingston. His wife predeceased him nine years ago.

Dr. H. G. Berry, of Mt. Clemens, Mich., and Ohaton, Alberta, passed away suddenly at his late farm residence on August 19.

Dr. Berry became interested in the Camrose district more than 25 years ago and among other properties acquired his Ohaton ranch where in more recent years he had specialized in registered polled Angus cattle. He regularly sent animals to the Calgary and Edmonton spring sales.

He was a medical officer during the World War and attained the rank of Colonel during his service as head of a war hospital overseas. He retired a few years ago from medical practice.

Dr. Berry frequently spent six months of the year at his ranch and was a familiar figure in the town.

Mrs. Berry predeceased her husband three years ago.

Dr. John Henry Richard Bond, aged 86, of Winnipeg, died on August 22.

He was a staff doctor in an Auckland, New Zealand, hospital for a time, and married Mrs. Bond in 1888. In 1889 they moved to the United States, and in 1893 came to Winnipeg. Dr. Bond practiced for a time in Winnipeg, retiring about 20 years ago.

Dr. Thomas Byrnes, aged 37, on the staff of the Ontario Hospital, Queen St. W., Toronto, died suddenly at his home on Dovercourt Rd., on September 23.

Ten days before Dr. Byrnes had been in collision with a cartage truck on Queen St. W. A wheel passed over his foot and his body was bruised. He received treatment but became very ill afterward. Chief Coroner Lawson said the accident injuries aggravated his condition but were not the direct cause of death.

Dr. James Houston Campbell, attending physician at the Kingston Penitentiary since 1941, died on August 27 at the Kingston General Hospital.

Born in Kingston, son of Mrs. Campbell and the late Dr. J. W. Campbell, he was educated in Kingston schools. He entered Queen's University in 1919 and in 1926 graduated from there with an M.D. degree. He was a veteran of the First Great War.

After leaving Queen's he went to New York where he practised his profession until 1941 when he returned to Kingston. He was a member of St. Andrew's Presbyterian Church.

Surviving are his widow, one son, James, his mother and one brother, Dr. W. A. Campbell, Kingston.

Dr. John Samuel Chisholm died at Holy Family Hospital, Prince Albert, on September 2, in his 75th year. Dr. Chisholm and his father conducted a medical practice in Wingham and when it was taken over by Dr. Redmond he remained for about four months and then in May, 1905, went to Prince Albert where he has since lived. He graduated from the University of Toronto in 1899.

Dr. H. M. Coffyne, aged 69, passed away in a Regina hospital on September 1 after a long illness.

Le docteur E.-G. Dagenais est décédé 13 septembre à sa maison d'été de la rivière des Prairies. Il était âgé de 77 ans.

Né le 10 juin 1868 à Ste-Rose, comté de Laval, il fit ses études au séminaire de Ste-Thérèse. Il fut reçu médecin à l'université Laval de Montréal.

Conseiller municipal de 1902 à 1910, il fut à la même époque président du comité d'hygiene. Il est l'un des fondateurs de la Bibliothèque Municipale. Il fut l'un des plus ardents promoteurs de la Goutte de Lait et on lui doit l'inspection médicale des écoles.

En 1915, il s'engagea dans le corps médical outremer et fit partie de l'Hôpital Laval avec le grade de capitaine. A la cessation des hostilités, il demeura à Paris puis à Versailles, avec sa famille. Il revint définitivement au Canada en 1937.

Dr. James Edward Forfar, aged 88, died on September 22 in Toronto. He had been active until recent years when he was stricken with blindness.

Dr. Forfar was born at Claremont, Ont., and after graduating from Uxbridge High School, taught school for six years. He was a graduate in 1889 from Victoria College and the following year from the University of Toronto. Later he took postgraduate work in New York.

Dr. Forfar served two terms as a trustee with the Toronto Board of Education. Keenly interested in music, he compiled a system of teaching music, which became known as the "Forfar Kindergarten System". He was a staunch supporter of the temperance cause, a Liberal and a member of Sherbourne St. United Church.

Dr. L. A. B. Grier, aged 65, died in his automobile about five miles east of Creelman, on the afternoon of September 26. Dr. Grier was on the medical staff of the North Battleford Mental Hospital and for three weeks previous had been doing special eye work at the Weyburn Mental Hospital. Dr. Grier was born in Ontario and graduated from the University of Toronto in 1908. He practised for three years in Ontario before coming to Saskatchewan in 1911 and locating at Creelman. Later he went to Newfoundland as a medical missionary, returned to Canada in 1916 and joined the Medical Corps during the first Great War. He served until 1918, then went to Unity where he practised until 1927, going back to Ontario for a couple of years. He returned to the west to Senlac, and in 1910 joined the medical staff of North Battleford Mental Hospital. Surviving him are his widow and a sister, Mrs. Boyd, of Toronto.

Dr. Amy Dora Adams Hare, wife of Dr. Robert B. Hare, of Simcoe, died at her home in Simcoe on September 13. She was the daughter of Mrs. J. Frank Adams and the late Dr. Adams, of Toronto. She attended Branksome Hall, the Toronto Conservatory School of Expression, and taught physical education at Macdonald Hall, Guelph.

In 1923 she graduated from University of Toronto School of Medicine, where she was outstanding in undergraduate and administrative work, directing the first skit given by women medical students at Daffodil Night. With her husband, she went to England for postgraduate work, and was on the staff of South London Hospital for Women. On their return to practice in Simcoe, Dr. Dora Hare was program convener for many years for the local branch of the Ontario Medical Association. She and her husband were instrumental in bringing many prominent musicians there for concerts.

Dr. William Choate Herriman, aged 78, Canada's oldest psychiatrist, died on September 27, at his home in Toronto. He retired as medical superintendent of the Ontario Hospital, Queen St. W., in July, 1933.

Born in Orono, Dr. Herriman's father and grandfather had both practised medicine before him and his grandfather was instrumental in the founding of the medical school at Queen's University. They were one of the prominent U.E.L. families in the Port Hope-Cobourg district.

Graduating in medicine from University of Toronto in 1890, he practised with his father for a short time in Lindsay before commencing a 40-year career in psychiatry. He took a leading part in the introduction into Canada of the continuous bath and other modes of treatment for mental illness.

Dr. Herriman was assistant physician at Ontario hospitals at Orillia, Hamilton, Kingston and Mimico; and superintendent at Toronto. He was a member of Durham County Old Boys' Association and of the United Church.

Dr. Herriman is survived by a daughter, Dorothy Choate Herriman, known in Canadian literary circles.

Dr. Clifford Evan Howard, son of Mrs. Nellie M. Howard and the late Evan R. Howard, of Brockville, died at Ogdensburg on August 10.

Born at Gananoque on April 21, 1905, Dr. Howard had been in failing health for the past seven months. He received his preliminary education in Brockville public schools and in the collegiate institute here. He attended Queen's University and graduated in 1928, receiving the degrees of B.A. and M.D. He was captain of the Queen's football team during championship years and was a most prominent player. He took a postgraduate course in the Royal Victoria Hospital in Montreal. He received an appointment as staff physician and surgeon for the St. Lawrence Paper Company, at Trinty Bay, Que. In 1932 he joined the psychiatric staff of Binghamton State Hospital, Binghamton, N.Y. Dr. Howard was promoted to clinical director three years ago and was transferred to Ogdensburg State Hospital where he since resided.

A much admired man, beloved by a multitude of friends, there is great regret felt at his untimely passing. He is survived by his widow, the former Laura W. Hubble, of Kingston, one son, John Grant, at home, his mother, Mrs. E. R. Howard, two sisters, Mrs. Claude Collins, (Evelyn), of Brockville, and Mrs. Ross Livingston, (Phyllis), of Kitchener.

Dr. F. E. Latta, aged 68, chief medical officer for the Department of Veterans' Affairs, Kingston branch, died on August 17 at the Kingston General Hospital.

Dr. Latta was born at Corbyville, educated at Belleville, and later received his medical degree from the University of Toronto. He was a veteran of the South African War and the first Great War.

He came to Kingston following the first Great War and had held the position of chief medical officer of veterans' affairs since that time.

Dr. Frederick Lessel died recently at Wolfville, N.S., where he had made his home for the past five years. He was born in 1881. Educated at Morris Street School and Halifax County Academy, he graduated in medicine from Dalhousie University in 1903. After postgraduate work, London, he returned to Halifax where for over thirty years he specialized in anæsthetics. For many years he was head of the Department of Anæsthesia at the Victoria General Hospital.

Apart from the activities of his profession, he was keenly interested in yachting, skating and in later years in curling.

At the time of the Halifax Explosion in 1917 Dr. Lessell played a very active part. The following year, during the severe outbreak of influenza in Boston he, along with Dr. Lewis Thomas and Dr. J. G. MacDougall, both of Halifax, went to Boston to give what assistance they could. At the time of the explosion the medical profession in Boston rendered invaluable aid to Halifax by sending physicians and supplies. The voluntary service of Dr. Lessell and his confrères

was an attempt to return in a small way a great service which will never be forgotten as long as the memory of the explosion remains.

Dr. Dougall Stonewall Macdougall, who practised medicine in Russell, Ont., for over 50 years, died on August 23, at his residence following a lengthy illness. He was in his 83rd year.

Dr. Macdougall, who devoted most of his time to his practice, was interested in village affairs, and was often associated with community endeavours which proved progressive for Russell.

Born in Russell on May 3, 1863, he was the son of the late John Macdougall and Elizabeth McTavish. He received his primary education in the village school, and following his graduation from McGill University, he settled in Russell 57 years ago.

Surviving are his widow, the former Ella Maude Cameron, and a daughter, Dorothy, of Saginaw, Mich.

Dr. Kenneth Alexander MacLean, chief physician of the International Nickel Company medical centre, was drowned in Whitefish bay, in the Birch island area on August 25.

Dr. MacLean was on a fishing excursion with two companions when the unfortunate incident occurred. They had left the MacLean summer home below Whitefish Falls around 6 o'clock and were about two miles down the bay when the outboard motor stopped.

In efforts to repair the motor trouble, Dr. MacLean and Mr. Stewart were exchanging positions in the boat when the former fell overboard. He was a good swimmer, but probably inhaled a quantity of water by his sudden plunge and only came to the surface once. His companions could not swim, and without oars in the boat were helpless to render assistance in the suddenness of the fatality.

Dr. Oscar Mercier, vice-dean of the medical faculty of the University of Montreal, drowned on September 14 at Saint Hippolyte de Kilkenny, during a rowboat excursion to his country home. He was 47 years of age.

The tragedy occurred in late afternoon in full view of his son, Andre, and his wife.

At an inquest where incidents leading to the drowning were revealed, a verdict of accidental death was returned.

Dr. Mercier, his wife and his son boarded a rowboat at the lake shore, and were rowing toward the opposite side of the lake. When the group were about 20 feet from their destination, one of the oars snapped. The slight accident apparently unnerved Dr. Mercier, who fell into the lake. Andre, his son, proffered the remaining oar, but the doctor cried that he would swim to the shore. Hampered by his clothes and tiredness, the physician sank below the surface. Efforts by his son and wife to rescue him proved fruitless.

Dr. Mercier, one of the most celebrated French Canadian physicians, was born on February 18, 1898, in Montreal. He was the son of the late Oscar Felix Mercier, surgeon, and the late Alexine Rolland, daughter of the Hon. J. D. Rolland.

Dr. Mercier was professor of urology at the University of Montreal and head of the urology department of the Hotel Dieu for a number of years.

He attended St. Mary's College, studied medicine at the University of Montreal and the University of Paris, from which he received a doctorate in 1925.

He was a past president of the Association of French-speaking Doctors in North America and past vice-president of the International Society of Urology. He was also a member of many French urological societies and associations and the American Urological Association.

Dr. Mercier published two medical books in Paris and contributed to numerous medical journals. He was a member of the Cercle Universitaire and the Laval-sur-le-Lac Club.

Surviving members of his family are his widow, the former Jeanne Bruneau; five sons, and three daughters.

Dr. John P. Mitchell, retired chief medical officer of Central Region, Canadian National Railways, died on September 22 at the Toronto General Hospital after a brief illness. After graduating from the University of Toronto Medical School in 1898, Dr. Mitchell practised in Toronto for some years. He later joined the medical department of the C.N.R. He was a member of the Academy of Medicine. Surviving are a sister, Miss E. S. Mitchell, and two brothers, Charles and Alfred Mitchell, all of Toronto.

Dr. Albert Edward Murphy died suddenly at Stayner, Ont., on October 4. He was born in 1876 and graduated from the University of Toronto in 1905. He leaves a widow and two sons, Captain H. A. L. Murphy, R.C.A.M.C., and L.A.C. Arthur Murphy, R.C.A.F.

Dr. Frederick Ottewell died on August 24, at his home in Ladner, B.C. He was born in Goodwood, B.C. Besides his widow he is survived by two sons and a daughter.

Dr. Roswell Park, aged 55, died on September 10, in the Hamilton General Hospital after a protracted illness.

Born at Fisherville, he attended the Chesley High School and was a graduate in medicine from the University of Western Ontario in 1912. He interned at Hamilton General Hospital and later served during the first World War with the Royal Army Medical Corps in France, Egypt and Palestine.

Dr. J. C. Richards, who practised for several years at Welwyn, Saskatchewan, died suddenly in Toronto on September 14, at the age of 64. He was well known in the Welwyn and Moosomin districts having contested the Moosomin Constituency as Social Credit nominee in 1938. He was a native of Newfoundland, a graduate of the University of Toronto 1911, and had practised in southern Saskatchewan before coming to Welwyn. He registered in Saskatchewan in 1918. For the past three years Dr. Richards had been engaged as medical officer at the Victory Factory at Malton, Ont. His death is deeply regretted by many friends in the Welwyn and Moosomin districts.

Dr. J. M. Rogers, of Ingersoll, Ont., died on August 16. Born in the town of Mount Forest, Ontario, Dr. Rogers came to Ingersoll to practise as a physician and surgeon just before the turn of the century. He was a graduate of the Toronto University and of Trinity Medical School. He was the oldest living medical practitioner in Oxford County and was noted for his skill as a surgeon.

Dr. Rogers was instrumental in the inauguration of the Alexandra Hospital and had served on the Hospital Trust for a number of years. He was a valued member of St. John's Lodge, No. 68, A.F. and A.M., having been a member of the Masonic craft for over 50 years. Dr. Rogers was always willing to help in any cause for the advancement of the town and served on the Victory Loan Committees as joint chairman during the years of the recent war. He was an enthusiastic curler and lawn bowler and the local club has a trophy for local competition donated by Dr. Rogers. He also was interested in golfing.

Besides his widow he is survived by three sons, Major Dr. Reginald John Rogers; Donald M. Rogers, of Toronto, and Capt. William P. Rogers.

Dr. Robert B. Spear, aged 64, well-known Sherbrooke doctor, died on August 29. Born in Sherbrooke,

he was educated at Danville, Bishop's University and McGill University, and practised in Sherbrooke as an eye specialist for 35 years.

Dr. Gilbert E. Story, of Edmonton, passed away on August 14, at the age of 67. He was a graduate of Queen's University in the class of 1907, and in the fall of that year came to Alberta and settled at Viking, being the centre of the district for which he was medical officer during the construction of the Canadian National Railway. While at Viking, he went to England for postgraduate work. In 1918, he practised in Edmonton, where he remained until he died.

Dr. William Henry Sutherland, aged 68, former minister of public works in the British Columbia government, one of the best-known surgeons in the province, died on September 3.

Dr. Sutherland, who was living in retirement at the time of his death, was member for Revelstoke from 1916 to 1936, and minister of public works from 1922 to 1928, when the Liberal government was defeated. Later he became house surgeon at Hotel Vancouver.

Born at Sea View, Prince Edward Island, Dr. Sutherland received his early education at the Prince of Wales College, Charlottetown, and his medical degree at McGill.

He was house surgeon at the Royal Victoria Hospital in Montreal from 1899 to 1901, then became divisional surgeon for the C.P.R. and moved to Kamloops. A year later he went to Revelstoke.

Dr. Sutherland was elected mayor of Revelstoke in 1912, a post he held until elected to the provincial legislature.

In 1909 he was president of the British Columbia Medical Council.

He was regarded as a leading figure in the Liberal party.

Dr. Sutherland married Miss Ruth Catherine McKinnon, of Vancouver. Surviving are Mrs. Sutherland, a son, Capt. William Sutherland, Vancouver; three daughters, Mrs. Patricia Hinton, of Ottawa and Helen and Shirley Anne at home; two brothers and two sisters in eastern Canada.

Dr. Burns Walker died at Summerland Hospital, B.C., on September 26. Widely-known throughout the Dominion, Dr. Walker was the son of Mr. D. M. Walker, former well-known teacher at the Niagara Falls Collegiate Vocational Institute.

Dr. Walker came to Niagara Falls at the age of thirteen years and attended the Niagara Falls Collegiate where his father taught. He attended the University of Toronto and graduated as a gold medalist in the Faculty of Medicine there, later lecturing at Toronto University. Afterwards Dr. Walker was associated with the MacKenzie and Mann Company in the construction of the Grand Trunk Pacific Railway.

A veteran of the first World War, he served overseas as a captain in the Medical Corps during the entire fighting. Dr. Walker practised in Winnipeg, Manitoba, for more than twenty years. Two years ago, he moved to Vancouver because of ill health.

Dr. William James Weekes, of London, Ont., who practised medicine in Ontario for more than half a century, died on August 21. He was believed to be the oldest practising doctor in Ontario until he retired from his practice several weeks ago. Death followed a short illness.

Born 90 years ago in Mosa Township, Dr. Weekes was of the old line of family doctors. He mixed his own medicines for his patients and used to carry a leather bag filled with the materials for the prescriptions when he went out on a call.

After teaching school for several years in Mosa he graduated in 1886 with the first class of men to take their complete medical training at the University of Western Ontario. After graduation he practised in Thorndale for eight years and then came to London.

He was a past president of the London Academy of Medicine, and taught for many years as a lecturer on medical jurisprudence at the Medical School.

He was a member of Dundas Centre United Church, and St. John's Lodge, 209A, A.F. and A.M.

Surviving are four brothers, Major G. N. Weekes, London, Thomas, in Alberta, Alfred and Herbert, both of Glencoe, and two sisters, Mrs. Evelyn Kerr, Lambeth, and Mrs. W. M. Leonard, Delhi.

Dr. F. H. Wells, of Port Elgin, Ont., died on August 10. Dr. Wells began his practice in the village of Conestogo, later coming to Port Elgin where he continued to reside until his death.

He leaves to mourn his loss his widow, two daughters Dorothy (Mrs. Hague), of Toronto; Leigh (Mrs. Mossing), of Buffalo; and one son, Francis, of Toronto.

Dr. Ernest Hamilton Wickware, of Smiths Falls, died unexpectedly from a seizure at his summer home on the Big Rideau on September 2. He was widely known in educational circles throughout Ontario.

Dr. Wickware had been a dominating and forceful figure in the stability and progress of Smiths Falls for the past 43 years. He was born in Morrisburg in 1877.

Dr. W. L. Yeomans died at Bucyrus, O., on August 30. Dr. Yeomans was born at Mount Forest, May 25, 1874, attended the public and high schools there and after graduating in medicine from the University of Toronto and serving an internship in Toronto and Hamilton hospitals he went in 1899 to Bucyrus and established a practice which he followed successfully for almost 46 years until he was forced by ill health to retire. He was licensed to practise medicine in both New York and Ohio and periodically attended Mayo clinics for the study of advanced surgery. He was long an advocate of the municipal hospital system and was prominently connected with the Bucyrus hospital from the time of its establishment.

Fraternally, Dr. Yeomans was a member of various units of the Masonic lodge and of the Scottish Rite of Columbus Valley; the Elks and the Bucyrus Country Club. For many years he was a member of the Rotary Club, but he gave up this membership because of his failing health. He was also a member of the Methodist church and from time to time served on various church committees.

News Items

Alberta

Drs. Ronald H. Horner, Walter S. Anderson, and P. H. Malcolmson were recently discharged from the Forces, to permit them to return to their teaching in the University of Alberta. In addition to being on the staff, they all are engaged in private practice.

Dr. F. O. Galbraith, of Stettler, is in the east doing postgraduate work and Dr. E. J. McFadyen is looking after his practice.

Dr. Emma Johnstone, who seems to have a bent for pioneer life, has started to practise at Winfield, about 50 miles west of Wetaskiwin.

Dr. W. A. Lincoln, of Calgary, has been appointed representative of Alberta on a special committee dealing with fees, meeting in October in Ottawa. While there, he will represent the Alberta Division at the

meeting of the Executive Committee of the C.M.A. in lieu of Dr. John W. Scott, of Edmonton, who is unable to attend.

Alberta has two mobile units, which are doing good work throughout the Province. Up to July 16, they had x-rayed over 127,000 persons; 134 were found probably active, and 1,586 probably inactive. They found, however, 3,356 other abnormalities.

Permission was obtained from the Federal Government to take the necessary steps towards the erection of a new anti-tuberculosis hospital on the University of Alberta grounds; but after obtaining this permission, construction has been delayed on account of the difficulty in getting supplies.

Dr. E. B. Roach, pædiatrician, of over thirty years' practice in Calgary, has moved to Chilliwack, B.C.

The Alberta Department of Health, in its campaign against venereal disease, has offered to supply free to members of the medical profession, all the penicillin needed in this campaign.

Two years ago, the Alberta Government decided to give 12 days' free hospital services, public ward rates, for maternity cases, and during the year ending March 31, 1945, this service cost the Government almost $455,000.

Medicine Hat will have a municipally owned hospital. This was decided at a recent meeting of the City Council. The proposed addition to the present hospital will have a capacity of 80 beds and an operating room which will be a complete unit connected to the present hospital by a corridor. The cost will be $250,000, which will be raised by debentures.

Professor John James Ower, head of the Department of Pathology, Alberta University, has been appointed Dean of the Faculty of Medicine in this Institution as from September 1, 1945.

G. E. LEARMONTH

British Columbia

Plans are afoot for the building of a medical dental building in Victoria and progress is being made in this direction. The building will contain an operating suite and the ground floor will be devoted to stores. A keen interest is being taken in the project by the medical men in Victoria.

The annual dinner of the Vancouver Medical Association will be held on November 30, or thereabouts, this year, for the first time since the beginning of the war. This function was discontinued during the war, and we are all happy to see it resumed as it has been one of the outstanding events of the medical year. This dinner will be devoted largely to welcoming back members who have been away on military service.

Dr. W. T. Lockhart has retired from active practice and gone to live on Salt Spring Island, which is rapidly becoming a centre for retiring medical men from Vancouver. Dr. Lockhart has been one of the most valuable members of the Vancouver Medical Association. For many years he acted as treasurer, and his service in this connection was outstanding. He also worked on the Relief Committee and was a trustee of the Association. The Vancouver medical profession owes a great debt of gratitude to Dr. Lockhart, and wishes him a long and happy retirement from active duty.

Another well-known Vancouver man, Dr. F. Brodie, has also retired and gone to Salt Spring Island. Dr. Brodie was also an outstanding member of the profession in Vancouver. He was president of the Association, one of its trustees, and filled many other positions, greatly to the advantage of his fellows. Our best wishes go to him and Mrs. Brodie in their new life.

Dr. J. A. Gillespie is another member of the profession who has retired. He is a life member of the Canadian Medical Association, has filled most of the offices in the Vancouver Medical Association, including the presidency, and has had a long and distinguished career as a medical man in Vancouver.

Surgeon Commander W. M. Paton, of Vancouver, has been discharged from the Naval Services, and is resuming practice.

Amongst others returning to practice are Major A. C. Gardner Frost, of Vancouver, and Major F. H. Bonnell, who is associated with Drs. Whitelaw and McIntosh, radiologists in Vancouver.

Congratulations are due to Dr. A. H. Meneely, of Nanaimo, the president of the British Columbia Medical Association. Dr. Meneely has done yeoman's service on committees and elsewhere for the Association, and well deserves the honour that he has received.

J. H. MACDERMOT

Manitoba

Surgeon Commander C. W. MacCharles, R.C.N.V.R., who for several years before the war practised in Winnipeg and was a member of the Honorary Attending Staff of the Winnipeg General Hospital, has been appointed medical health officer of Northumberland and Durham. These counties constitute the first county health unit opened by the government of Ontario. Dr. and Mrs. MacCharles will reside in Cobourg.

Dr. John H. R. Bond, a pioneer radiologist of Winnipeg, who died on August 22, 1945, bequeathed $24,314 to the British government toward the cost of World War II. The testator's home at 167 Donald St. was given to the Salvation Army for the benefit of the Winnipeg work.

A resolution passed by the Fort Garry Home and School Association directed its executive to make efforts to obtain a medical health centre for the district. The resolution also urged that a public health nurse be secured in the near future with a view to betterment of the health of the children.

Dr. M. S. Lougheed, health officer of the city of Winnipeg, has been nominated as a candidate for the provincial legislature in the coming elections.

Practical nurses in Manitoba will henceforth be licensed.

It is probable that the municipal doctors of the province will organize into a group and be affiliated as a society within the Manitoba Medical Association.

It is announced that Major John Crawford, R.C.A.M.C., senior medical officer of the Winnipeg Grenadiers who were forced to surrender at Hong Kong on Christmas Day, 1941, arrived in San Francisco on October 2, and in Winnipeg shortly after. Winnipeg Grenadiers who have already returned from their long imprisonment tell of his courage and resourcefulness in tending the sick and wounded. He was obliged to perform operations with mercurochrome as the only antiseptic, a razor blade for a scalpel, and two planks instead of an operating table.

ROSS MITCHELL

New Brunswick

Lieut.-Col. H. B. Bustin and Lieut.-Col. W. J. Murphy both of Saint John have recently returned from overseas and are awaiting demobilization before resuming their peace time duties.

Major F. C. Jennings has been discharged from the armed forces and is at once assuming his hospital appointments and general practice.

The 65th annual meeting of the New Brunswick Medical Society was held at Edmundston this year on October 2-3 under the chairmanship of Dr. P. C. Laporte, M.B.E., President of the Society.

The delay in discharge of medical officers from the R.C.A.M.C. and the medical services of the Navy and Air Force is causing some distress in civilian circles. The six years of war has made old doctors older and in communities from which young doctors enlisted it is felt that these young men should be given an opportunity to fill gaps in the medical ranks of their home towns before strangers supplant them. It is to be hoped that representation made in their behalf in cases of special need will be given a high priority.

Lieut.-Col. Joseph Tanzman has been awarded the O.B.E. in recognition of outstanding service in operations overseas. Lieut.-Col Tanzman commanded No. 14 Field Ambulance in France, Belgium and Holland.

The Commissioners of the Saint John General Hospital have decided to add a new x-ray therapy unit to their already extensive installation, due to the increasing work of the Cancer Clinic in that hospital.

Major Robert Gregory has returned to Saint John after long service in Europe where his special training in the treatment of mental diseases was of unusual value in the several centres where he acted as consultant in psychiatry.

Dr. L. L. Frenette, until recently practising in Bathurst, N.B., is at present doing postgraduate work in tuberculosis in Montreal. On his return to New Brunswick he will assume new duties as Medical Director of the Sanatorium at Notre Dame des Lourdes.

Lieut.-Col. J. A. Melanson, of Moncton, has been appointed Chief Medical Officer of the Department of Health of New Brunswick. His appointment is to take effect October 1, 1945. Dr. Melanson succeeds Dr. Charles MacMillan who resigned to accept a position with McGill University. Dr. Melanson is a veteran of both Great Wars. He has especially distinguished himself as second in command of No. 14 Field Ambulance and as assistant director of hygiene at Second Canadian Corps Headquarters. He was mentioned in dispatches for services in Europe. Dr. Melanson was born in Shediac, N.B., graduated in medicine from Edinburgh University and studied tuberculosis at Riverglade Sanitarium, East Saint John Hospital and at Trudeau School of Tuberculosis. He received his diploma in public health from the University of Toronto. He has served as tuberculosis diagnostician and public health officer in various districts.

Dr. Melanson assumes his duties at a time when the field of public health is of extreme interest and his long experience plus the advantage of army hygiene service will enable this bilingual New Brunswick doctor to attack old and new problems with the enthusiasm for which he is well known.

A. S. KIRKLAND

Nova Scotia

On September 5, 1945, the cornerstone was laid of the new Victoria General Hospital. The first building was erected in 1857 at a cost of ten thousand pounds, operated for a short period as the City Hospital, and then closed. It re-opened again ten years later as the City and Provincial Hospital and for twenty years continued under joint management. Its ownership then passed entirely to the Province and, in honour of Queen Victoria's Golden Jubilee, it was named Victoria General Hospital. The year following, two large wings were added to the original building, and various units, as the need arose, since that time.

The present building under construction will be open, it is hoped, before the end of 1946. It will represent the latest in hospital planning and construction in Canada, and structurally will be the tallest building in the Maritime Provinces.

At the ceremony, addresses were given by Mr. Justice Carroll, Chairman of the Hospital Commission, and Dr. F. R. Davis, Minister of Public Health and Welfare. The cornerstone was laid by Honourable A. S. MacMillan, Premier of Nova Scotia, as his last public act before retiring from office.

This is the only general hospital owned and operated by a Provincial Government in the Dominion. With more room and enlarged facilities it will increasingly promote the essential participation of the Province in the field of diagnostic and curative medicine as well as providing an invaluable source of medical education.

With the announcement that ex-premier Tojo of Japan had attempted suicide on the eve of his imprisonment came the news that the physician who gave the blood transfusion in the American Army Hospital soon afterwards was Dr. Roy Gold, of Sydney, a graduate of Dalhousie Medical School, 1938, and one of the few Canadian physicians in the American forces. It would appear that in Tojo's case the "Gold cure" was quite effective.

Entering the political arena as a candidate for the first time in the forthcoming Provincial election is Dr. Robert MacLellan, of Rawdon Gold Mines.

The two latest of our confrères to return from overseas are Colonel V. O. Mader and Major C. M. Bethune, both of Halifax.

Dr. M. G. Tompkins, of Dominion, stole quietly away to Newfoundland for a few days' salmon fishing late in August. His many friends will be glad to know that his health is considerably improved.

Dr. B. P. Babkin of the Department of Physiology at McGill University, and formerly Professor of Physiology at Dalhousie, addressed the Halifax Medical Society on October 3. He received a warm welcome from his many friends in Nova Scotia.

H. L. SCAMMELL

Ontario

Thirty-seven medical officers arrived in Toronto on October 1. Most of them were young men who are not yet qualified for discharge. They will be assigned to relieve a number of senior officers who are due for retirement.

W. H. Cruikshank, M.D., D.P.H., D.Psych., has been appointed medical director of the Bell Telephone Company of Canada. He succeeds the late Dr. Grant Fleming. Dr. Cruikshank is a graduate of the University of Toronto of the class of 1936 and was with the Ontario Department of Health from 1936 to 1943. For the past two years he has been with the forces serving with the rank of Major in Italy and Europe with the 5th Division of the Canadian Army.

Appointment of Capt. R. G. Murray of the Royal Canadian Army Medical Corps as full-time lecturer in the department of bacteriology and immunology of the Medical School of the University of Western Ontario has been announced. He is a graduate of McGill University and interned in Royal Victoria Hospital in Montreal. His father, Professor E. Murray, is a professor of bacteriology at McGill.

M. H. V. CAMERON

Prince Edward Island

Dr. Harold Shaw, who recently returned after several years' service with the armed forces, has been appointed to re-assume his duties at the Provincial Sanatorium. They will include the setting up of a complete technical laboratory, which will provide facilities for innumerable examinations and will permit the testing here for cancer.

Lieut.-Col. Donald Campbell has been awarded the O.B.E. by his Majesty the King for distinguished service overseas. He joined the 21st Field Ambulance on August 29, 1939, as a Lieutenant. In June, 1940, he was promoted Captain while in Sydney, N.S. In July, 1940, he helped in organizing the No. 7 Canadian General Hospital staff and in August of the same year was promoted Major. From Sydney, Col. Campbell went to Debert, N.S., where he remained until going overseas in November, 1941. In September, 1942, he was promoted Lieut.-Colonel in charge of the surgical division of No. 7 Canadian General Hospital.

Quebec

Les Drs Philippe Panneton et François Badeaux viennent d'être portés respectivement titulaires aux chaires d'oto-rhino-laryngologie et d'ophthalmologie de la faculté de médecine de l'Université de Montréal.

Un ancien membre de la Société des hôpitaux universitaires de Québec, le Dr Paul deVarenne, chef de radiologie et de la clinique du cancer à l'hôpital d'Ottawa vient d'être nommé membre du Conseil facultatif de l'Institut de recherche et de traitement du cancer de l'Ontario.

JEAN SAUCIER

The following medical officers have recently returned from active service, and are in process of resuming practice.

Surgeon Lieut. Commander R. Denton, R.C.N.V.R.
Lieutenant-Colonel Philip Hill, R.C.A.M.C.
Major Palmer Howard, R.C.A.M.C.
Wing Commander John Howlett, R.C.A.F.
Lieutenant-Colonel John Kilgour, R.C.A.M.C.
Lieutenant-Colonel Joseph Luke, M.B.E., R.C.A.M.C.
Major P. N. MacDermot, R.C.A.M.C.
Colonel C. A. MacIntosh, R.C.A.M.C.
Lieutenant-Colonel Howard Mitchell, R.C.A.M.C.
Wing Commander John Nicholls, R.C.A.F.
Major Gordon Petrie, R.C.A.M.C.
Squadron Leader Bram Rose, R.C.A.F.

William Harvey Cruickshank, M.D., D.P.H., D.Psych., has been appointed medical director of The Bell Telephone Company of Canada to succeed the late Dr. Grant Fleming. Born at Bognor, Grey County, Ontario, Dr. Cruickshank graduated from the University of Toronto in 1936 and interned at Toronto Western Hospital. In December, 1937, he joined the Ontario Department of Health and was associated with the Hospital and Psychiatric Division and the Industrial Hygiene Division. In 1943, he joined the active service forces, and with the rank of major, R.C.A.M.C., served with distinction in Italy and northwestern Europe with the 5th Division.

Saskatchewan

It has been announced by Dr. C. F. W. Hames, Deputy Minister of Public Health that consideration is being given to restricting the sale of penicillin to prescription by physicians. The drug is on sale in some drug stores, but the Provincial Health Department is watching its sale closely. If there are indications that harm results from penicillin sales it is understood the Government will take steps at once to make such sales subject to prescription.

Dr. O. M. Ranson formerly of Elrose has recently located at Lethbridge, Alberta; and Dr. J. R. McCrimmon who practised for many years at Meadow Lake is now practising at Pincher Creek, Alberta.

Three new registrants since last report are, Dr. M. G. Moore, L.R.C.P.(Lond.), M.R.C.S.(Eng.), recently returned to Canada to become associated with his father, Dr. S. E. Moore, of Regina; Dr. A. F. Perl, of Provost, Alberta, M.D. Vienna 1926, carries on some practice across the Alberta border; and Dr. H. Laird Wylie, M.D. Manitoba 1941, who will be associated with Dr. F. E. Werthenbach, of Unity, upon his release from the R.C.A.F.

Captain Ralph G. Miller, formerly of Wapella, is expected back shortly and, it is reported, will return to his former practice. He had been on active service since 1942.

Major Harold Chestnut, of Moosomin, has returned to Canada after 5 years overseas. He had the experience of serving with the Imperial Army as a medical officer with a field ambulance through the entire African and Italian campaigns. Major Chestnut was present at the Salerno beach-head landing where he served as a battalion medical officer temporarily, winning the Military Cross for conspicuous service and devotion to duty.

J. G. K. LINDSAY

General

Physician-Artists' Prize Contest. — The American Physicians Art Association, with the co-operation of Mead Johnson & Company, is offering an important series of War (Savings) Bonds as prizes to physicians in the armed services and also physicians in civilian practice for their best artistic works depicting the medical profession's "skill and courage and devotion beyond the call of duty".

For full details, write to the Association's Secretary, Dr. F. H. Redewill, Flood Bldg., San Francisco, Cal., or Mead Johnson & Co., Evansville 21, Ind. Also pass this information on to your physician-artist friends, both civilian and military.

Eye-Bank for Sight Restoration.—A large and representative group has been formed in New York under the name of "Eye-Bank for Sight Restoration, Inc." This group will serve as a council which aims at establishing a nation-wide eye bank for obtaining and making available healthy corneal tissue to restore the vision of persons whose sight has been lost through affection of the cornea. Fellowships which will enable advanced study in causes of corneal affections and their treatment are also included in the plan.

This eye bank is somewhat similar to a blood bank in helping to restore the sight of persons whose vision has been destroyed because of corneal affections, by replacement of healthy tissue from the eyes of other persons. The bank will locate, obtain and have accessible as needed, this all-important corneal tissue. This can be obtained only from persons whose eyes have been removed but in whom the corneal tissue is still healthy, or by obtaining the healthy eyes of persons immediately after death.

Examinations for American Board of Obstetrics and Gynæcology.—The next written examination and review of case histories (Part I) for candidates will be held in various cities of the United States and Canada and by special arrangements at Army and Navy Stations on Saturday, February 2, 1946, at 2.00 p.m. Candidates who successfully complete the Part I examination proceed automatically to the Part II examination held later in the year. All applications for this year's examinations must be in the office of the Secretary by November 1, 1945.

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh 6, Pennsylvania.

Book Reviews

A History of Medicine. D. Guthrie, M.D., F.R.C.S. 448 pp., illust. 30/–. Nelson, Edinburgh, 1945.

What one asks for first in a history is that it be readable; there is too much merely solid reading. Dr. Guthrie's book is both pleasant and important. There are other histories of medicine but there is most decidedly a place for another of the quality of this one. Perhaps one reason why medical history is not granted the recognition it should receive is because of the general style of its presentation. What the average medical man asks for is a clear and easily assimilable outline. There are certain landmarks of men and achievements which are sufficient for an intelligent grasp of the picture and these are well presented in this volume. It may seem a rather large contract to cover the history of medicine from its earliest known beginnings to the early 20th century, but Dr. Guthrie has shown that the essentials of the genesis of medicine can be very satisfactorily compressed into a short compass. As more and more figures begin to crowd the stage it becomes necessary to sketch their personalities and this is very excellently done. Ambroise Paré seems to have caught the author's eye rather specially, but one would not have minded even more of the extracts from his reminiscences. The reference under Harvey to the aged Thomas Parr might have shown a little more scepticism regarding his mythical 153 years, but it is hard to find anything which one would have had left out, and the balance between the greatest figures in medicine and the lesser though still important lights, is admirably kept. Thumbnail sketches and apt quotations maintain the interest steadily.

The bibliographies to each chapter are essential; in addition the appendix contains notes on various historical sources which are of unusual value as guides to reading. Garrison's History is rightly called the medical historian's Bible, but it must of course be supplemented with biographies and further studies, and of these Dr. Guthrie gives as full a list as most men will need. A final word of high commendation must be given to the numerous and extremely well selected illustrations, the last one in the book being that of Osler at work on his textbook.

Endocrinology of Woman. E. C. Hamblen, Clinical Professor of Endocrinology, Duke University School of Medicine. 571 pp., illust. $10.75. Thomas, Springfield; Ryerson Press, Toronto, 1944.

This volume covers the whole field of female endocrinology and includes as well a chapter on the testes. The book is divided into 5 parts. In Part I the endocrine glands are discussed in regard to their history, embryology, anomalies, anatomy, histology, secretory control, chemistry, physiology and interrelations. Part II is concerned with endocrine physiology as related to antenatal growth, childhood and adolescence. The endocrine physiology of menstruation, pregnancy and the climacteric are also discussed. Part III entitled "Endocrine Diagnostic Methods" presents general diagnostic procedures such as routine physical and gynæcological examination. The technique of endometrial biopsy and vaginal smear examination is outlined as well as biological endocrine tests such as the Ascheim-Zondek and its modifications. A chapter on the value of x-ray data as indirect and direct evidence of endocrine function is included. Part IV is entitled "Functional Disorders of the Endocrine Glands". These disorders are discussed on a basis of hypo- and hyper-function. Part V "Endocrinology Applied to Gynæcological Disease" includes the common gynæcological endocrine problems such as sterility, dysmenorrhœa and functional bleeding as well as chapters on abnormal skeletal growth, obesity and abnormal sexual differentiation.

The division of the book into 5 parts has not led to a smooth even presentation of the subject. For example the various aspects of menstruation are discussed in four of the five parts of the book. Controversial matters are impartially discussed and the value of hormone therapy is conservatively presented particularly in the sex hormone field. Androgen therapy in the female is mentioned only to be condemned. The book is well illustrated and the photomicrographs are excellent.

Vital Statistics and Public Health Work in the Tropics. P. G. Edge, Lecturer in Division of Epidemiology and Vital Statistics, London School of Hygiene and Tropical Medicine. 188 pp. $3.75. Baillière, Tindall and Cox, London; Macmillan, Toronto, 1944.

This is an excellent little book which deals, not with the technical aspects of statistical analysis, but with the more fundamental problem of gathering reliable data from primitive peoples. While it is mainly tropical in its objective, it can be read with interest and profit by every medical man and particularly by those who have to work among tribes or communities where local customs, taboos and similar circumstances, make it difficult to collect information pertaining to life, morbidity and death. It is true that such communities exist in the tropics and Major Edge, who is on the staff of the London School of Hygiene and Tropical Medicine, has had considerable personal experience with such problems.

After a review of public health bookkeeping, he deals with methods of counting or estimating the populations, the registration of births and the collection of records of sickness, especially where these must be made by laymen. He offers valuable suggestions for securing the accuracy of these statistics and gives abbreviated lists of diseases drawn from the International List.

It is so obvious that post-war health reconstruction will depend on an accurate knowledge of what actually exists in a community in the nature of disease, will depend in other words, on facts, that Major Edge's book and the suggestions drawn from his wide experience will be invaluable to those who must collect these facts.

Hayfever Plants, their Appearance, Distribution, Time of flowering, and their Rôle in Hayfever, with Special Reference to North America. R. P. Wodehouse, Ph.D., Associate Director of Research in Allergy, Lederle Laboratories. 245 pp., illust. $4.75. Chronica Botanica Co., Waltham, Mass.; Thorburn & Abbott, Ltd., Ottawa, 1945.

It is one thing to be a botanist, and another to be an allergist. And yet, the two fields of knowledge are so closely related that the allergist at any rate must know at least something about the botanical aspect of his specialty. For the botanist the corresponding need is not so great. The present account of hayfever plants is written mainly from the botanical point of

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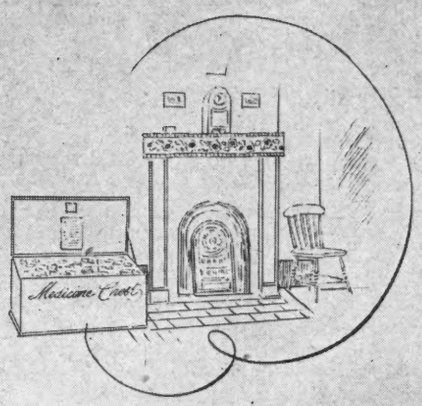
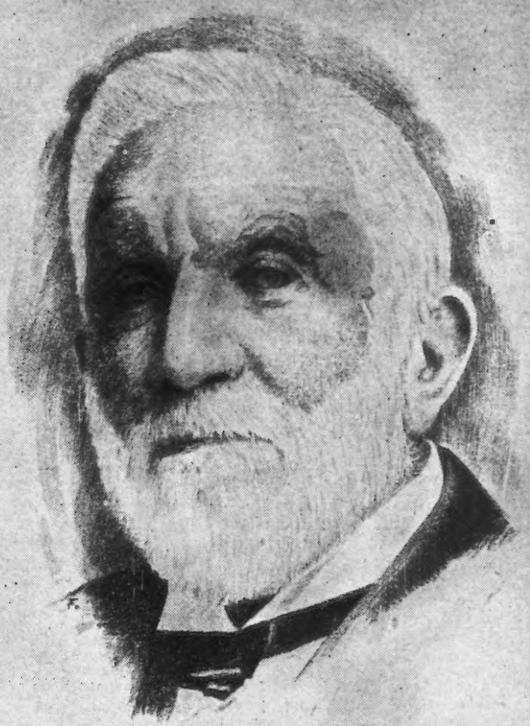


The medicine chest brought to Vancouver Island by Dr. Helmcken on the "Norman Morrison"



Hon. J. S. Helmcken

M.D., R.C.S., M.R.C.S. 1825—1920

TO John Sebastian Helmcken goes the undisputed honour of being the first white medical practitioner in British Columbia. About 1865 he was said to be "the leading physician from San Francisco to the North Pole and from Asia to the Red River".

Helmcken was born in London, England, in 1825. He served several years of a drug apprenticeship and then became a student at Guy's Hospital. On completing the course he was granted a diploma from the Royal College of Surgeons, England; also a license from the Apothecaries Society. During his first two years' residence at Guy's Hospital he saw all of the operations performed without an anaesthetic and later was present the first time ether was administered before surgery. For his brilliance in his studies Helmcken received an appointment to the Hudson's Bay Company's ship "Prince Rupert" on its voyage to York Factory on Hudson's Bay, and return. The reward of a further year of study was the degree M.R.C.S. England.

In 1850 the ship "Norman Morrison" arrived in Esquimalt Harbour bringing a number of pioneer immigrants. Smallpox had broken out during the voyage but so skilfully did the young surgeon, John Sebastian Helmcken, treat his patients that the epidemic was halted and few casualties resulted. For his friendly, generous and humorous nature Helmcken soon was beloved by all in the new colony. He distinguished himself in his profession, both in his private practice and as Coroner and Health Officer. He was appointed first president of the British Columbia Medical Association in 1885. At the same meeting his son, Dr. James Douglas Helmcken, was elected secretary-treasurer. He was active in the provincial government, representing Esquimalt in the first House Assembly of Vancouver Island. After Confederation he was offered a Senatorship but declined, preferring to continue his medical practice.

Helmcken Road in Victoria commemorates the life of this pioneer physician—a life spent in service to his fellow countrymen. The devotion to his profession which Helmcken exemplified inspires this company to reaffirm faith in its policy . . . Therapeutic Exactness . . . Pharmaceutical Excellence.

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view, but, as is well known, Dr. Wodehouse's interest in the part played by pollen in disease is longstanding and profound.

The opening chapter deals with a number of miscellaneous points; some elementary botanical facts; comments on the types of plants which are most likely to cause hayfever; methods of collecting and counting atmospheric pollen; and a short bibliography of the best books on the subject. The next two chapters deal with the hayfever plants in detail and the fourth chapter takes up regional surveys. The hayfever problem in Canada is very similar to that met with in the United States, though perhaps somewhat less acute. Much of the information, therefore, in this book will be of value to Canadian physicians. There will have to be some supplementing with Canadian papers on the subject. As an authoritative and comprehensive survey of the botanical side of hayfever the book is in the first class.

The Doctor's Job. C. Binger, M.D. 243 pp. $3.00. Norton & Co., New York, 1945.

This is a book written by a physician concerned with medicine in the widest sense of the word. Here one finds no limited technician engaged and fascinated by the technicalities of his job. Dr. Binger has obviously pondered not only the problems of his patients but their widest social implications. He has related them to life. It is with the significance to the patient of his illness and of what the doctor does to him and, more particularly, with him, that this book is concerned.

All patients, and most physicians, are aware that there is a great and serious need for information in this area. There was a period not very long ago when it was stoutly maintained that it was not good for the patient to know what was wrong with him. The doctor, serious, black-coated, pontifical, examined the patient in various and, to the latter, inscrutable ways, and then retired to confer with his family. From this conference communiqués of perturbing ambiguity were issued with an optimism which was most depressing to most patients.

As our knowledge of human behaviour has grown, we have come to realize the great importance of the patient having a good working concept of his troubles so that he can join his efforts with the physician's in doing something constructive. This book deals thoughtfully and penetratingly with this problem of working with patients as people over against working with patients as diseases.

Large Scale Rorschach Techniques. A Manual for the Group Rorschach and Multiple Choice Test. M. R. Harrower-Erickson, Research Associate, Department of Neuropsychiatry, University of Wisconsin. 419 pp., illust. $8.50. Thomas, Springfield, 1945.

Rorschach's test, used in individual cases, has become one of the most useful methods of personality investigation. Much of the research that laid the ground for the psychological techniques described in this manual has been carried out by one of its authors, Dr. Harrower-Erickson, at the Montreal Neurological Institute. This first edition gives the results of her interesting and ingenuous work on the possibilities of widening the scope of the original Rorschach test by applying it to large groups of subjects simultaneously. She has also devised a further modification which consists in a standardized multiple choice test based on Rorschach's method, but briefer, simpler and less subjective in its administration.

The reader should be familiar with the principles of the Rorschach test, since much of the material is presented in technical form. For the experienced Rorschach worker, this manual is extremely useful and almost indispensable. One may question, however, whether it is advisable to furnish "educators, social workers, probation officers and workers in the industrial field" who are not trained in the method with a "simple" test of emotional stability, as seems to be the author's intention.

It may be said that this book is outstanding for its progressive approach to the subject, its new and interesting data, its extensive references, and the evident regard the author and publisher have had for the maintaining of accuracy and quality in the preparation of text and book.

Lead Poisoning. A. Cantarow, Associate Professor of Medicine, Jefferson Medical College and M. Trumper, Lieut.-Commander, H-V (S), U.S.N.R., Naval Medical Research Institute, Bethesda, Md. 264 pp. $4.00. Williams & Wilkins, Baltimore; University of Toronto Press, Toronto, 1944.

This book is of special interest to industrial physicians and other public health workers in the field of industrial hygiene. The reviewer is inclined to think that although the material, for the most part, is excellent, it is too technical to be of great value to the general practitioner.

Available data on the subject of lead poisoning has been well assembled, but in many instances, conclusions have not been drawn regarding conflicting ideas. Emphasis is placed on the so-called "lead line". This sign should not be stressed too much, for in this era of improved mouth hygiene, it is seen only occasionally and not constantly as stated on page 41. All too often such findings as defective hygiene, pyorrhœa and staining of the teeth are mistaken for a lead line. One is tempted to say that it would improve diagnosis if this phenomenon had never been described.

Exception is taken to the statement on page 219 regarding the methods for determination of lead. These are not equal in sensitivity and precision. The size of the samples should be based on the nature of the particular operation and on fluctuation in the environment, rather than on the ease of subsequent analysis and calculations. It is unnecessary to purify diathazone as purified diathazone is available from chemical supply houses.

The book as a whole is a valuable contribution to the literature on lead poisoning.

Lectures on Diseases of Children. Sir R. Hutchison, Consulting Physician to the London Hospital and to the Hospital for Sick Children, Great Ormond Street, and A. Moncrieff, Physician to the Children's Department, Middlesex Hospital. 9th ed., 478 pp., illust. $6.25. Edward Arnold, London; Macmillan, Toronto, 1944.

With the collaboration of Dr. Moncrieff, Dr. Hutchison has produced a new edition of his book that is still unique and well maintains the position it has held for the past forty years. Written in the form of lectures, it is easier to read, and the important facts are emphasized in his own way, with his enormous clinical experience in the back ground. The emphasis on common symptoms is valuable and with the clinical descriptions unusually complete, the diagnosis is made much simpler. From the frequent case histories, one visualizes the important details of treatment and helpful hints are given, which are not found in the books of other writers. There are also many excellent illustrations, which add to the value of the lectures. Some of the chapters have been rewritten and all the material has been brought up to date. It is valuable also as expressing the English point of view, which is always worth comparing with the American. It is a book that can well be added to the library of the general practitioner and the specialist.

Marihuana Problem in the City of New York, Sociological, Medical, Psychological and Pharmacological Studies, by the Mayor's Committee on Marihuana. 220 pp. $2.50. Jaques Cattell Press, Lancaster, Penn., 1944.

In recent years the problem of marihuana smoking has received a great deal of publicity in North

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America. Many articles have been written on the subject in magazines and newspapers. As a result of this widely disseminated information, the public has been led to believe that the users of the drug are true addicts, that physical and mental deterioration occur from prolonged use, that it is a positive factor in many major crimes and sexual offences, and that marihuana smoking is widespread amongst high school children in the U.S.A. This book, therefore, is very timely. It contains a number of articles written by the members of a committee formed at the instigation of the Mayor of New York City. In 1940, the committee began a very complete study to discover the extent of the marihuana problem in the City of New York and the effects of the drug on individuals. The committee was composed of seventeen experts in the fields of internal medicine, psychiatry, public health and pharmacology. Their study, as reported in this book, leaves nothing to be desired in the way of thoroughness, and their conclusions are the result of careful scientific observation. Their findings give definite refutation to the exaggerated and melodramatic claims which have been made about the use of the drug and its harmful effects. The most interesting articles are those devoted to the sociological, psychological and clinical investigations that were carried out. The last article in the book describes the pharmacological aspects of marihuana in considerable detail.

Medical men, social workers and others who come in contact with users of marihuana will find this book indispensable. It is very readable and, apart from the articles on medical and pharmacological aspects, it should appeal to the general reader. The marihuana habit is not as prevalent in this country as it is in the rest of America, but because of the easy accessibility of the drug, it may become more widely used in Canada in the future. Therefore, it is important that accurate information be readily available and this authoritative book provides an excellent source.

Microbial Antagonisms and Antibiotic Substances. S. A. Waksman, Professor of Microbiology, Rutgers University; Microbiologist, New Jersey Agricultural Experiment Station. 350 pp., illust. $3.75. Commonwealth Fund, New York, 1945.

Pasteur observed the antagonistic effects of certain micro-organisms upon others and since those earliest days of bacteriology a sporadic curiosity about such inter-relationships has been shown in occasional publications. The discovery of the remarkable chemotherapeutic properties of penicillin reawakened interest in and stimulated research on microbial antagonisms. Already some fifty different preparations possessing antibacterial properties and derived from the activities of micro-organisms have been described. The publication of this book by one of the leading authorities on microbial antagonism is very timely.

Waksman introduces the subject by a discussion of soil and water basins as habitats of micro-organisms. The nutrition of the microbial cell in these natural substrates and its growth in pure cultures and in mixed populations is treated briefly. This naturally leads to a discussion of symbiotic and saprophytic relationships. The survival and destruction of pathogenic bacteria in soil and water introduces a more detailed description of antibiosis. Various theories as to the nature of antagonistic action are listed and discussed. Chapter 4 describes methods of isolating and culturing antagonistic micro-organisms and of measuring antibiotic action. The following chapters deal with bacteria, actinomycetes, fungi and microscopic animal forms as antagonists. To biochemists and organic chemists Chapter 10 may prove to be the most interesting since in it the chemical nature of antibiotic substances is fully described. Experimental biologists may well find Chapter 11 the most informative and stimulating for it reviews the mechanisms of antibiotic action. The final chapters discuss the utilization of antagonistic micro-organisms and antibiotic substances for the control of diseases of humans, animals and plants. Waksman offers a challenge to the microbiologist, chemist and physiologist in the concluding chapter in which possible future developments are formulated.

The extensive coverage of original articles and reviews is illustrated by the bibliography which contains over 1,000 references. The subject matter is clearly presented and much useful information has been condensed into tabular form. This book should prove extremely valuable to the experimental biologist, bacteriologist, physiologist, and all who have an interest in chemotherapy.

Physiology in Health and Disease. 4th ed. C. J. Wiggers, Professor of Physiology and Director of Physiology Department in the School of Medicine of Western Reserve University, Cleveland, Ohio. 1174 pp., illust. $11.50. Lea & Febiger, Phila.; Macmillan, Toronto, 1944.

In this fourth edition within a period of ten years, Professor Wiggers presents an up-to-date version of a treatise which bids fair to become a standard for texts of this type. A very large portion of the book has been rewritten, references to easily available and current literature have been extended and many of the illustrations and diagrams improved.

A great deal of new material dealing with war physiology has been incorporated. This is critically assessed. Despite these new additions, the length of the text has not been increased. This is especially commendable since the author has managed to rearrange and condense most of the material formerly dealt with.

The reviewer has used this book as a standard guide in this field since 1937 and there is no hesitation in recommending this edition as among the best of its class.

The Specificity of Serological Reactions. Revised edition. K. Landsteiner, Rockefeller Institute for Medical Research. 310 pp. $5.00. Harvard University Press, Cambridge, 1945.

This edition brings to a culmination the contributions from the pen of this famous scientist. It is indeed fortunate that the manuscript of the book had been completed before the author's death in June of 1943. Science in indebted to the author's son and those who collaborated with him in preparing the work for publication in its final excellent form.

In revising the book the author has almost completely rewritten the text adding more than a hundred pages. In addition to extending the discussion on the specificity of proteins, the chemical nature of antigens and antibodies, the artificial conjugated antigens and specific non-protein cells substances, a new chapter has been introduced on the nature of antigen-antibody reactions. The concluding chapter, contributed by Linus Pauling, is most appropriate, for it prepares us for a more fundamental understanding of specificity in biological phenomena.

The book is remarkable for its succinctness and clarity of presentation. Only a writer with Landsteiner's wide knowledge and experience from half a century of investigation, could integrate and condense the voluminous literature represented in his bibliography, so logically and concisely. The volume will be welcomed by all students of serology and immunology.

A Textbook of Histology, Functional Significance of Cells and Intercellular Substances. E. V. Cowdry, Professor of Anatomy, School of Medicine, Washington University. 3rd ed., 426 pp., illust. $8.00. Lea & Febiger, Phila.; Macmillan, Toronto, 1944.

Those who are not familiar with this book through its first two editions should be warned that it is a most unusual kind of a textbook. It is not a book that, after it is picked up, can be put down easily,

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indeed any doctor who glances at its first pages is very likely to find presently that he has read another book. Like a good story, it engages one's interest at its very beginning and holds it chapter by chapter as sketches of life in the different parts of the cellular community that comprise a human body are unfolded. Much emphasis is put on the fluids of the body; individual cells of different types are pictured as living in a habitat of tissue fluid that is constantly renewed and refreshed from the circulating blood in the capillaries. One gets the impression of action on almost every page of the book as well as the integration of actions.

The third edition of this book appears in a considerably smaller volume than its predecessor. According to the author, this reduction in size has been accomplished by "lightly passing over the minutiæ".

Although this book would inspire a beginner in histology, it is perhaps better adapted to advanced students, research workers, and graduates than to those who are just beginning to look down microscopes. It presumes a certain amount of preliminary knowledge on the part of its reader. This is particularly true of the illustrations, which though greatly improved in this edition, still tend to favour advanced rather than simple matters.

The Avitaminoses. The Chemical, Clinical and Pathological Aspects of the Vitamin Deficiency Diseases. W. H. Eddy, Emeritus Professor of Physiological Chemistry, Teachers College, Columbia University and G. Dalldorf, Pathologist of the Grasslands and Northern Westchester Hospitals, New York. 3rd ed., 438 pp., illust. $5.50. Williams & Wilkins, Baltimore; University of Toronto Press, Toronto, 1944.

The first section of this book is devoted to a review of the nature and functions of the various vitamins and of the requirements for them. This material includes brief historical reviews and discussions of the chemical nature of the vitamins. The second section deals with the gross and microscopic changes in the various avitaminoses and is illustrated with 47 excellent plates. The concluding chapters are on "The vitamins and infectious diseases" and "Medical care of nutritional failure". The third section outlines vitamin assay methods and laboratory tests.

An excellent bibliography is included and two tables showing the vitamin A, B_1, B_2, C, niacin, pantothen, pyridoxine, inositol, biotin, folic acid, choline and para-aminobenzoic acid contents of many foods. Such complete tables are not commonly available.

The book as a whole is well written and laudably conservative in tone. Most of it is fairly technical, but it should be of great value to scientists and clinicians who are interested in vitamin deficiency diseases.

Peripheral Nerve Injuries. W. Haymaker, Neuropathologist, Army Institute of Pathology, Washington. 227 pp., illust. $5.00. Saunders, Phila.; McAinsh, Toronto, 1945.

This work is a small, easily readable, profusely illustrated book which fills a much needed want for the busy army surgeon and general practitioner.

The subject is developed from the base fundamentals of the segmental and peripheral nerve supply of the skin, muscle and skeleton to the modes of investigation and examination required for arriving at the correct neurological diagnosis and the site of the peripheral nerve or plexus injury. The chapters on the analysis of the movements tested in a neurological examination are most excellent and are instructively illustrated. Numerous photographs of actual cases of typical nerve lesions are used, associated with explanatory anatomical sketches, to demonstrate the lesions. This particular feature adds greatly to the practical value of this book.

Clinicians who are not constantly in touch with neurological cases can, when confronted with a problem of this nature, readily find the essential points for arriving at a correct anatomical diagnosis by a few minutes' study of this most excellent work.

Bronchial Asthma. L. Unger, Assistant Professor, Department of Medicine, Northwestern University Medical School, Chicago. 724 pp., illust. $12.00. Thomas, Springfield, Ill.; Ryerson Press, Toronto, 1945.

This book reflects the lengthy experience of the author and is highly recommended. The subject is well and systematically covered, the point-of-view is a modern, orthodox one but with full attention to the opinions of others. The completeness with which the medical literature has been reviewed is attested by the numerous references at the close of each chapter. These references, even if set in larger type than usually employed for this purpose, fill approximately eighty-two pages.

A short consideration is given to the other allergic diseases and there is a valuable chapter on the military aspects of allergy. A short laboratory section deals mainly with the preparation of extracts and the book is completed by an appendix which includes sources of allergens, information and special instructions to patients, elimination diets and food diaries, physical exercises for asthma, patent medicines used in allergy and instructions for oral hyposensitization to foods.

Criticisms of this book are minor. Desensitization (hyposensitization) is recommended for a greater variety of allergens than is usually recommended by conservative workers and oral methods of hyposensitization to foods is rather stressed. The excellence of the format of the book is reflected in the price.

Surgery, a Textbook for Students. C. A. Pannett, Professor of Surgery, University of London. 740 pp., illust. 35s. Hodder and Stoughton Ltd., Warwick Square, London, England, 1944.

The author has attempted to present the facts of general surgery in as few words as possible. This is apparently in order that the undergraduate might most simply obtain a sufficient grasp of the subject to satisfy any examiner. Whether this is a sound principle is debatable. Subjects for which the student has separate examinations are omitted (*e.g.*, gynæcology). It would appear that this book is written to aid a certain type of medical curriculum. The value of the book for students in Canadian medical schools appears limited.

If this book is for general knowledge it would appear that many subjects are under-emphasized and others over-emphasized. Thus, the subject of burns and scalds is dealt with in slightly over three pages, frostbite in two short paragraphs, while tetanus has a chapter of its own. This is very much out of proportion to the importance of these lesions as present in Canadian practice. The chapter on the hand has some very useful points emphasized, although it is noted that in this chapter on page 631, "Thiersch" is spelled "Tiersch" and "Wolfe", "Wolf".

Whether it is possible to write a suitable single volume textbook on surgery for Canadian students or not is problematical, but this does not seem to this reviewer to be it.

BOOKS RECEIVED

Rypins' Medical Licensure Examinations, Topical Summaries, Questions, and Answers. Edited by W. L. Bierring, Member, National Board of Medical Examiners. 5th ed., 546 pp. $7.50. Lippincott, Montreal, 1945.

Manual of Surgical Anatomy. Prepared for National Research Council, T. Jones and W. C. Shepard. 195 pp., illust. $5.75. Saunders, Phila.; McAinsh, Toronto, 1945.